# Regulation of Hepatic Long Non-coding RNAs by PXR and CAR Agonists in Mouse Liver

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### Running Title:

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### **Abbreviations:**

5MeC, DNA methylation and cytosine 5th position; AhR, aryl hydrocarbon receptor; AS, anti-sense; BAM, binary alignment/map; CAR, constitutive androstane receptor: ChIP-Seq. chromatin immunoprecipitation coupled with high throughput sequencing; CYP, cytochrome P450; FPKM, fragments per kilobase of exon per million reads mapped; H3K27me3, H3 lysine 27 trimethylation; H3K4me2, H3 lysine 4 di-methylation; HISAT, Hierarchical Indexing for Spliced Alignment of Transcripts; HNF, hepatocyte nuclear factor; IncRNA, long noncoding RNA; PCG, protein-coding gene; PCN, pregnenolone-16αcarbonitrile; PXR, pregnane X receptor; SAM, sequencing alignment/map; siRNA, small interfering RNA; TCPOBOP, 1, 4-bis[2-(3, dichloropyridyloxy)]benzene; TSS, transcription start site; TTS, transcriptional termination site; UTR, untranslated region

### **ABSTRACT**

Altered expression of IncRNAs by environmental chemicals modulates the expression of xenobiotic biotransformation related genes and may serve as therapeutic targets and novel biomarkers of exposure. The pregnane X receptor (PXR/NR1I2) is a critical xenobiotic-sensing nuclear receptor that regulates the expression of many drug-processing genes, and it has similar target gene profiles and DNA binding motifs with another xenobiotic-sensing nuclear receptor, namely constitutive andronstrane receptor (CAR/Nr1i3). To test our hypothesis that IncRNAs are regulated by PXR in concert with protein-coding genes (PCGs) and to compare the PXR-targeted IncRNAs with CAR-targeted IncRNAs, RNA-Seg was performed from livers of adult male C57BL/6 mice treated with corn oil, the PXR agonist PCN, or the CAR agonist TCPOBOP. Among 125,680 known IncRNAs, 3,843 were expressed in liver and 193 were differentially regulated by PXR (among which 40% were also regulated by CAR). The majority of PXR- or CAR-regulated IncRNAs were mapped to the introns and 3'-UTRs of PCGs as well as intergenic regions. Combining the RNA-Seg data with a published PXR ChIP-Seq dataset (Cui et al., 2010b), we identified 774 expressed IncRNAs with direct PXR-DNA binding sites, and 26.8% of differentially expressed IncRNAs had changes in PXR-DNA binding following PCN exposure. De novo motif analysis identified co-localization of PXR with LRH-1, which regulates bile acid synthesis, following PCN exposure. There was limited overlap of PXR binding with an epigenetic mark for transcriptional activation (histone-H3K4-di-methylation, H3K4me2), but no overlap with

epigenetic marks for transcriptional silencing (H3K27me3 and DNA methylation). Among differentially expressed IncRNAs, 264 were in proximity of PCGs, and the IncRNA-PCG pairs displayed a high co-regulatory pattern by PXR and CAR activation. This study was among the first to demonstrate that IncRNAs are regulated by PXR and CAR activation and that they may be important regulators of PCGs involved xenobiotic metabolism.

### **INTRODUCTION**

Long non-coding RNAs (IncRNAs) are functional transcripts over 200 nucleotides in length whose genes are estimated to comprise at least 62-75% of the human genome (Djebali et al., 2012; St Laurent et al., 2015). According to the ENCODE Project, IncRNAs represent approximately 80% of functional sequences in the human DNA and are the predominant non-ribosomal and nonmitochondrial RNA species in human cells (Kapranov et al., 2010; Consortium, LncRNAs transcribed proximally or distally to protein-coding genes 2012). (PCGs) can modulate a wide spectrum of biological events, including chromatin epigenetic remodeling, transcription factor assembly, alternative splicing, mRNA stability, and protein translation efficiency (Geisler and Coller, 2013; Karlsson and Baccarelli, 2016; Dempsey and Cui, 2017). Growing evidence in the literature suggests that IncRNAs are novel biomarkers and/or key contributors during physiological, pharmacological, and toxicological responses, including complex human diseases, developmental disorders, as well as xenobioticinduced adverse outcomes (Dempsey and Cui, 2017).

Many IncRNAs are highly expressed in liver, which is a major organ for xenobiotic biotransformation and nutrient homeostasis. A stringent computational pipeline identified 15,558 IncRNAs that are expressed in mouse liver, based on an analysis of 186 mouse liver RNA-Seq datasets ranging over 30 biological conditions (Yu et al., 2017). Interestingly, Yu et al. also demonstrated greater inter-species conservations within DNA sequences and higher frequency of proximal binding by hepatic transcription factors in the liver-

expressed IncRNA gene promoters as compared to protein-coding gene (PCG) promoters (Yu et al., 2017). The liver-enriched IncRNAs were predicted to be metabolically sensitive regulators with diverse functions in physiological homeostasis, especially energy metabolism (Yang et al., 2016). Regulation of genes involved in energy metabolism and nutrient homeostasis by IncRNAs found in the literature include gluconeogenesis (Goyal et al., 2017), cholesterol and bile acid homeostasis (Ananthanarayanan, 2016; Lan et al., 2016; Yu et al., 2017; Zhang et al., 2017), lipid metabolism (Li et al., 2015; Chen, 2016; Yang et al., 2016; Li et al., 2017; Zhao et al., 2017), and non-alcoholic fatty liver disease (Chen et al., 2017).

In addition to modulating intermediary metabolism in liver, IncRNAs are suggested to modulate hepatic xenobiotic biotransformation. For example, two IncRNAs that are transcribed from the anti-sense strands of the DNA encoding the hepatocyte nuclear factor 1α (HNF1α) and HNF4α are important in regulating the major drug-metabolizing cytochrome P450s (Cyps) in human liver cancerderived HepaRG cells (Chen et al., 2018). Specifically, short hairpin RNA (shRNA) knockdown of the IncRNA gene *HNF1α* antisense 1 (*AS-1*) decreased the mRNA expression of PXR and CAR, as well as the expression of seven major P450s (CYP1A2, CYP2B6, CYP2C8, CYP2C9, CYP2C19, CYP2E1, and CYP3A4) in hepaRG cells. In addition, small interfering RNA (siRNA) knockdown of the IncRNA gene *HNF4α-AS1* increased the mRNA expression of PXR as well as the expression of six P450s (CYP1A2, CYP2B6, CYP2C9, CYP2C19, CYP2E1, and CYP3A4). This indicated that there is a complex

network between transcription factors and IncRNAs that regulate the expression of P450s (Chen et al., 2018).

During postnatal liver maturation, the developmental expression patterns of various lncRNAs have been unveiled at 12 developmental ages in mice (Peng et al., 2014), and the potential role of lncRNAs in regulating the ontogenic expression of the xenobiotic-metabolizing Cyps was proposed (Ingelman-Sundberg et al., 2013). LncRNAs have also been suggested to confer drug resistance through modulating the stability and translation of mRNAs that produce proteins involved in cell survival, proliferation, and drug metabolism (Pan et al., 2015). However, very little is known regarding to what extent the hepatic lncRNAs are regulated by exposure to drugs and other xenobiotics.

Regarding xenobiotic biotransformation, in liver, the nuclear receptors pregnane X receptor (PXR/Nr1i2) and constitutive androstane receptor (CAR/Nr1i3) are major xenobiotic-sensing nuclear receptors that can be activated by a wide spectrum of therapeutic drugs, environmental toxicants, dietary factors, and endogenous chemicals (Kliewer et al., 2002; Willson and Kliewer, 2002; Moore et al., 2003; Pacyniak et al., 2007). Upon activation, PXR and CAR play critical roles in xenobiotic bio-activation and detoxification (Handschin and Meyer, 2003). In addition, recent studies have unveiled novel functions of these drug receptors in various intermediary metabolism pathways, such as lipid and glucose metabolism (Poulin-Dubois and Shultz, 1990; Wada et al., 2009; Gao and Xie, 2010; Mackowiak et al., 2018; Pu et al., 2018). Our research group and others have extensively characterized the effect of

pharmacological activation of PXR and CAR on the regulation of various protein-coding genes, especially the drug-processing genes in liver (Cheng et al., 2005b; Maher et al., 2005; Kiyosawa et al., 2008; Pratt-Hyatt et al., 2013; Oshida et al., 2015; Cui and Klaassen, 2016).

There has been some investigation on effect of the CAR ligand 1, 4-bis[2-(3, 5-dichloropyridyloxy)]benzene (TCPOBOP) on the hepatic chromatin assembly and certain IncRNAs that contribute to liver tumor promotion (Lempiainen et al., 2013; Lodato et al., 2018). TCPOBOP differentially regulated 166 IncRNAs in liver that are produced from intragenic or anti-sense strand relative to PCGs that encode CAR-regulated drug-metabolizing enzymes, suggesting that an efficient co-regulatory mechanism may exist (Yu et al., 2017). In addition, two studies have investigated the effect of activating the xenobiotic-sensing transcription factor aryl hydrocarbon receptor (AhR) on the hepatic expression of IncRNAs (Recio et al., 2013; Grimaldi et al., 2018). However, there have been no systematic studies characterizing the effect of PXR activation on the regulation of liver-enriched IncRNAs and how PXR activation differs from CAR activation regarding IncRNA expression profiles.

Therefore, the purpose of the present study was to 1) determine the effect of pharmacological activation of PXR on the hepatic expression of lncRNAs; 2) to identify direct PXR-binding sites to the lncRNA gene loci and associated epigenetic signatures under basal and PXR activated conditions; 3) to compare the similarities and differences between PXR and CAR targeted lncRNAs; and 4)

to predict the IncRNA-regulated protein-coding gene networks following PXR/CAR activation in mouse liver.

### **MATERIALS AND METHODS**

### Chemicals

Corn oil (vehicle), the mouse PXR ligand pregnenolone- $16\alpha$ -carbonitrile (PCN;  $\geq 97\%$  purity; CAS Number 1434-54-4), and the mouse CAR ligand 1,4-bis-[2-(3,5-dichloropyridyloxy)]benzene,3,3',5,5'-tetrachloro-1,4-bis(pyridyloxy)benzene (TCPOBOP;  $\geq 98\%$  purity; CAS Number 76150-91-9) were purchased from Sigma-Aldrich (St. Louis, MO).

### Animals and procedures

As described previously (Cui and Klaassen, 2016), 12-week-old adult male C57BL/6 wild-type mice were purchased from Charles River Laboratories (Wilmington, MA) and were housed in an Association for Assessment and Accreditation of Laboratory Animal Care International-accredited facility (Animal Care and Use Program number 2011-1969) at the University of Kansas Medical Center (KUMC) with *ad libitum* access to the Laboratory Rodent Chow 8604 (Harlan, Madison, WI) and drinking water. The housing conditions were temperature- and humidity-controlled with a 14-hour light and 10-hour dark cycle in a temperature- and humidity-controlled environment. Mice were acclimated for at least one week within the animal facilities prior to experiments. Mice were administered PCN (200 mg/kg, i.p.), TCPOBOP (3 mg/kg, i.p.), or vehicle (corn

oil, 5 ml/kg, i.p.) once daily for four consecutive days (n=5 per group). Twenty-four hours after the final dose, livers were collected, immediately frozen in liquid nitrogen, and stored in a -80 °C freezer. All animal experiments were approved by the IACUC at KUMC.

### RNA isolation

Total RNA was isolated from mouse liver using RNA-Bee reagent (Tel-Test Inc., Friendswood, TX) per the manufacturer's protocol and quantified using a Nanodrop 1000 Spectrophotometer (Thermo Scientific, Wilminton, DE). RNA integrity was confirmed using gel electrophoresis and a dual Agilent 2100 Bioanalyzer (Agilent Technologies Inc., Santa Clara, CA). RNA samples used for cDNA library construction and RNA sequencing had RNA integrity (RIN) values between 7.0 and 10.0.

### cDNA library construction and RNA-Seq data analysis

The cDNA library preparation from poly-A selection was performed in the KUMC Genome Sequencing Facility, as described previously (Cui and Klaassen, 2016). Samples for sequencing were randomly selected (n=3 per group) from all biological replicates (n=5) for all studies. Sequencing was performed on an Illumina HiSeq2000 sequencer using 100 bp paired-end multiplexing strategy. FASTQ files and analyzed data are available at NCBI GEO database (GSE104734), and data were re-analyzed for the present study. Briefly, FASTQ files containing paired-end sequence reads were mapped to the mouse reference genome (GRCm38/mm10) using HISAT2 (Hierarchical Indexing for Spliced

Alignment of Transcripts) (version 2.0.5). The output SAM (sequencing alignment/map) files were converted to BAM (binary alignment/map) files and sorted using SAMtools (version 1.3.1). The transcript abundance for IncRNAs and PCGs was estimated by Cufflinks (version 2.2.1) using the NONCODE 2016 IncRNA and UCSC mm10 PCG reference databases, respectively. The mRNA abundance was expressed as fragments per kilobase of exon per million reads mapped (FPKM). LncRNAs and PCGs with an average FPKM above 1 in at least one sample were considered expressed. Differential analysis was performed using Cuffdiff, and transcripts with p < 0.05 were considered differentially regulated by chemical exposure. Data were expressed as mean FPKM ± S.E., and asterisks (\*) represent statistically significant differences between vehicle and chemical exposure. Two-way hierarchical clustering dendrograms of differentially regulated IncRNAs were generated using the native function of R.

Genomic annotation of IncRNAs and proximal IncRNA-PCG pair identification.

To annotate and visualize the genomic location of lncRNAs relative to the closest PCGs, the web-based tool peak annotation and visualization (PAVIS, <a href="https://manticore.niehs.nih.gov/pavis2/">https://manticore.niehs.nih.gov/pavis2/</a>) was used to identify lncRNAs proximal to PCGs, including 5 kb upstream of the transcription start site (TSS), intronic, exonic, 5'-untranslated region (UTR), 3'-UTR, and up to 1 kb downstream of the transcriptional termination site (TTS). A lncRNA and PCG are considered paired if 1) the lncRNA overlaps with or is within 5 kb upstream of the TSS or 1 kb

downstream of TTS of any PCG and 2) both the IncRNA and the proximal PCG were differentially expressed between vehicle and chemical exposed mice (FPKM > 1 at least one sample and p < 0.05). Gene structure and relative genomic location of the IncRNA-PCG pairs were visualized using Integrated Genome Viewer (Broad Institute, Cambridge, MA). Pathways that are associated with PCGs paired with IncRNAs were shown using Ingenuity Pathway Analysis (IPA) software.

PXR ChIP-Seq and motif analysis for PXR-DNA binding near IncRNA gene loci.

The PXR ChIP-Seq was performed in livers of corn oil or PCN exposed adult male C57BL/6 mice as described previously (Cui et al., 2010b), and data were re-analyzed for the present study. The chromosome coordinates of positive PXR DNA binding peaks in either corn oil or PCN exposed conditions were retrieved. The chromosome coordinates for the enrichment locations were adjusted to match mm10 using Galaxy to be consistent with the reference genome used in the RNA-Seq dataset. The IncRNA genes differentially regulated by PCN were examined for positive enrichment of PXR-DNA binding peaks within 10 kb upstream of the TSS and 10 kb downstream of the TTS. The Motif analysis of PXR binding sites near IncRNA gene loci was performed using Homer (findMotifsGenome.pl). DNA sequences associated with the PXR-DNA binding sites were retrieved using the mouse mm10 genome. The size of the analyzed DNA regions was set as 200 bp, and the motif lengths for *de novo* motif search were set at 8, 10, and 12bp.

### Epigenetic marks near PXR-regulated IncRNAs.

The positive enrichment of the active gene transcription mark histone H3 lysine 4 di-methylation (H3K4me2) as well as the gene silencing marks H3K27me3 and DNA methylation (5MeC) on chromosomes 5, 12, and 15 in livers of adult C57BL/6 male mice was determined by ChIP-on-chip as described before (Cui et al., 2009; Li et al., 2009; Choudhuri et al., 2010; Cui et al., 2010a). The chromosome coordinates for the epigenetic mark locations that were originally generated were lifted-over to mm10 using Galaxy to be consistent with the reference genomes used in the PXR ChIP-Seq and RNA-Seq datasets. The potential co-localizations of PXR and the three epigenetic marks within ±10 kb of the lncRNA gene loci were determined.

### **RESULTS**

# Overall comparison of PCN- and TCPOBOP-regulated liver-expressed IncRNAs

As shown in Figure 1, the majority (>120,000) of the IncRNAs were below the detection limit in mouse livers under any exposure condition, whereas approximately 4,000 IncRNAs were expressed (average FPKM > 1 in at least one group). Among these liver-expressed IncRNAs, most of them showed stable expression and were not altered following PCN (96%) or TCPOBOP (86%) exposure. PCN up-regulated approximately 2% and down-regulated 2% of the liver-expressed IncRNAs, whereas TCPOBOP up-regulated 7% and down-regulated approximately 7% of the liver-expressed IncRNAs.

As shown in Figure 2A, TCPOBOP in general had a more prominent effect than PCN in differentially regulating the liver expressed IncRNAs in that 193 IncRNAs were altered by PCN exposure as compared to 625 that were altered by TCPOBOP exposure. There were 81 IncRNAs that were commonly regulated by both PCN and TCPOBOP, suggesting that PXR and CAR have unique IncRNA gene targets in liver. A two-way hierarchical clustering dendrogram showed that biological replicates from the same exposure groups clustered together for the IncRNA gene expression (Figure 2B) and confirmed that TCPOBOP had a more profound effect in both up- and down-regulation of IncRNAs. This may be due to TCPOBOP being a highly potent activator of CAR, whereas the potency of PCN is less towards PXR activation.

## Genomic annotation of PCN- and TCPOBOP-regulated liver-expressed IncRNAs relative to PCGs and predicted gene networks

As a first step to predict the function of lncRNAs with regards to influencing the transcriptional output of PCGs, the genomic locations of PCN-and TCPOBOP-regulated lncRNAs relative to the PCGs were determined using PAVIS, and the lncRNA-PCG gene pairs were defined if they met all of the following criteria: 1) the lncRNA gene overlaps with or is within 5 kb upstream of TSS or 1 kb downstream of TTS of any PCG and 2) both the lncRNA and the proximal PCG were differentially expressed by PCN or TCPOBOP exposure (average FPKM > 1 and p < 0.05). These criteria were set based on the assumption that although exceptions may exist, lncRNAs produced locally around the neighboring PCGs have a more spatial advantage in influencing the

transcriptional output of these PCGs as compared to IncRNAs produced in distal regions (Orom et al., 2010; Kim et al., 2012; Villegas and Zaphiropoulos, 2015; Engreitz et al., 2016; Chen et al., 2018).

As shown in Figure 3A and Supplemental Table 1, following PCN exposure, 141 (73.1%) of 193 IncRNAs differentially regulated by PCN paired with distinct PCGs. The remaining 52 (26.9%) were produced from the intergenic regions and did not pair with any PCGs. As shown in Figure 3B, among the IncRNAs that paired with PCGs, the majority of them were produced from the intronic regions of PCGs (43%), followed by the 3'-untranslated regions (3'-UTRs) (14.5%), exonic regions (6.7%), downstream of TTS (5.2%), and upstream of TSS (3.6%). There were no IncRNAs that were co-differentially regulated by PCN and were produced within the 5'-UTR of PCGs that were differentially regulated by PCN. The PCGs that paired with IncRNAs formed distinct signaling networks including lipid metabolism, molecular transport, and small molecular biochemistry centering around ERK1/2, which is a MAP kinase that catalyzes the phosphorylation of many cytoplasmic and nuclear substrates (Supplemental Figure 1), as well as cellular growth and proliferation (Supplemental Figure 2). For example, HDL as well as its regulator serum amyloid A1 (SAA1) was down-regulated, whereas AMPK, which activates glucose and fatty acid uptake and oxidation, was up-regulated.

Following TCPOBOP exposure, additional IncRNA-PCG pairs were discovered. As shown in Figure 3C and Supplemental Table 2, 359 (73%) IncRNAs were paired with PCGs, whereas 134 were not paired (27.1%). Similar

to the PCN exposure conditions, the majority of the paired IncRNAs were produced from the intronic (34%) and 3'-UTR (21.5%) of the PCGs, followed by downstream (6.4%), upstream (6.1%), and exonic (5.3%) regions, whereas the mapping to 5'-UTR was minimal (0.2%) (Figure 3D). Also similar to PCN exposure, the PCGs that paired with IncRNAs following TCPOBOP exposure were also important for lipid metabolism and molecular transport (Supplemental Figure 3). For example, Apoliprotein A4 (ApoA4), which is a lipid transporter, was up-regulated, whereas SAA1, which plays an important role in HDL metabolism and cholesterol homeostasis, was down-regulated (Supplemental Figure 3). In addition, the carcinogenesis network was enriched in TCPOBOP-regulated PCGs that paired with IncRNAs (Supplemental Figure 4).

### PXR-DNA binding to PCN-regulated hepatic IncRNAs and motif analysis

As shown in Figure 4, both the total numbers of PXR-DNA binding sites and the cumulative PXR-DNA binding fold enrichment near the IncRNA gene loci (±10 kb) increased following PCN exposure. Approximately 70% of the differentially regulated IncRNAs had no PXR binding. Interestingly, among the direct PXR-targeted IncRNA genes, both the up-regulated and the down-regulated IncRNAs had increased PXR-DNA binding. This indicates that PXR has dual functions in the transcription of these IncRNAs—cis-activation and cis-suppression (Figure 4C and 4D)—likely due to a functional switch of other transcription factors that co-localize with PXR at these sites. To address this, *de novo* motif analysis was performed in IncRNA gene-associated PXR-DNA binding peaks in corn oil and PCN exposed conditions independently (Figure 4E).

Interestingly, in control conditions, HNNRNPA2B1 and RARa were significantly enriched in PXR-DNA binding sites of the IncRNA genes, whereas Nr5a2/LRH-1 was enriched by PCN. The molecular switches of these transcription factors may alter the fate of transcriptional output of PXR-targeted IncRNA genes. Other transcription factors associated with known DNA binding motifs within the PXR-DNA binding intervals around the differentially regulated IncRNA gene loci by PCN are shown in Supplemental Figure 5A.

Determining the potential co-localization of epigenetic factors and PXR near IncRNA gene loci.

Distinct PCN exposure associated permissive and repressive epigenetic marks have previously been identified on mouse chromosomes 5, 12, and 15 [see Materials and Methods]. In a preliminary investigation into the role of epigenetic marks and PXR binding on IncRNA expression, we searched for colocalization of PXR-DNA binding, specific epigenetic marks (H3K4me2, H3K27me3, and 5MeC) near IncRNA loci on the same chromosomes. The majority of the IncRNAs associated with these epigenetic marks or PXR were not expressed or not detected on the three chromosomes, likely due to the presence of other suppressive marks that were not investigated in the present study, or were not detected due to the method of RNA selection in the cDNA library preparation procedure (i.e. only poly-A tailed IncRNAs were captured) (Supplemental Table 3). Among the liver-expressed IncRNAs on these three chromosomes, the majority of stably expressed IncRNAs had positive enrichment of the active chromatin epigenetic mark H3K4me2 and PXR. The overlap

between H3K4me2 and PXR was also the most in the stably expressed IncRNA gene category. This indicates that H3K4me2 and PXR may act in concert to maintain the constitutive expression of liver-enriched lncRNAs. Interestingly, DNA methylation (5MeC), commonly thought to silence gene expression, was another epigenetic mark that co-localized with stably expressed IncRNA gene loci and overlapped a moderately with PXR binding sites. Paradoxically. although 5MeC is considered a gene silencing mark, our observation is consistent with the more recent literature report that many actively transcribed gene bodies are marked with 5MeC. This correlates with transcriptional activity rather than repression, that the basal function of gene body methylation facilitates the establishment of their constitutive expression, and that cytosinespecific methylation may regulate gene expression (Coleman-Derr and Zilberman, 2012; Vyhlidal et al., 2016). Following PXR activation, a moderate number of PCN-regulated IncRNAs (either up- or down-regulated) had positive enrichment of H3K4me2, and most of these IncRNAs had direct PXR-DNA binding sites. In contrast, almost none of the PCN-regulated IncRNAs had positive enrichment of H3K27me3 or 5MeC, and there was also no overlap between these epigenetic marks and PXR at these IncRNA gene loci (Supplemental Table 3).

Two examples of IncRNAs that had co-localization of PXR and H3K4me2 are shown in Figure 5A (a IncRNA that paired with a PCG encoding P450 reductase [Por] that is important for cytochrome P450-mediated hepatic drug metabolism) and Figure 5B (an intergenic IncRNA) with the gene annotation

shown in Supplemental Figure 6. As shown in Figure 5A, the IncRNA NONMMUG034025.2 and the neighboring PCG Por were co-up-regulated by PCN, and this was associated with increased PXR-DNA binding fold-enrichment around the IncRNA-PGC loci. In addition, this region was marked with the active gene transcription mark H3K4me2, but not H3K27me3 or 5MeC. As shown in Figure 5B, the PCN-mediated up-regulation of the IncRNA NONMMUG014541.1 was also positively associated with increased PXR-DNA binding and positive enrichment of H3K4me2, but was independent of PCGs.

Confirmation of the literature-reported CAR-targeted IncRNAs in liver following TCPOBOP exposure and comparison with the effect of PCN exposure

Consistent with the recently published study regarding the effect of the CAR ligand TCPOBOP on the hepatic IncRNA gene expression (Lodato et al., 2018), the present study confirmed the TCPOBOP-mediated increase in 6 IncRNAs (NONMMUG002974.2, NONMMUG017205.2, NONMMUG020358.2, NONMMUG021206.2, NONMMUG026099.2, and NONMMUG036870.2) (Figure as well as the TCPOBOP-mediated decrease in 5 IncRNAs (NONMMUG005073.2, NONMMUG009893.2, NONMMUG015071.2, NONMMUG028068.2, and NONMMUG041315.2) (Figure 6B). In comparison, at the given dose, the PXR ligand PCN up-regulated 3 of the same IncRNAs (NONMMUG021206.2, NONMMUG026099.2, and NONMMUG036870.2) as TCPOBOP, albeit to a lesser extent. PCN had only minimal effects on the other TCPOBOP up-regulated IncRNAs.

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### **DISCUSSION**

The key findings of the present study are 1) at the given doses for the nuclear receptor agonists, CAR activation affects the expression of more IncRNAs than PXR activation in liver, and both commonly and uniquely regulated IncRNAs are observed for the two receptors; 2) the majority of the differentially regulated IncRNAs are present in introns, intergenic, and 3'-UTRs relative to PCGs; 3) for both receptors, the top differentially regulated PCGs paired with IncRNAs are involved in lipid metabolism and molecular transport, highlighting the potential importance of IncRNAs in fine-tuning this signaling pathway in liver; 4) increased PXR-binding by PCN exposure may lead to either trans-activation or trans-suppression of direct IncRNA targets, and motif analysis suggests that this context-specific duality may be due to a molecular switch of co-localized transcription factors; 5) the epigenetic activation mark H3K4me2 may facilitate the PXR-recruitment to the genomic regions proximal to IncRNA gene loci for activation of gene transcription.

One technical limitation of this study was the inability to detect non-polyadenylated IncRNAs, which may also be important for liver functions, due to the use of poly-A tail selection in RNA-Seq library construction. This likely explains why a previous study identified more liver-enriched IncRNAs than the present study in mice (Figure 1) (Yu et al., 2017). It has been shown that the non-polyadenylated IncRNAs are generally expressed at lower levels than the non-polyadenylated mRNAs and are prevalent in the nucleus, suggesting that they may be involved in the transcriptional regulation of target genes (Cheng et

al., 2005a; Furuno et al., 2006). At this time, the ratio between polyadenylated lncRNAs and non-polyadenylated lncRNAs in liver is not known and most of the well characterized lncRNAs are produced using the same machinery as the PCGs (i.e. transcribed by RNA Pol-II, polyadenylated, and spliced) (Kung et al., 2013). Future studies using whole transcriptome analysis could use ribosomal depletion as an alternative library construction option, although the trade-off appears to be lower signal per transcript at the same read depth.

An experimental limitation of the present study is the lack of validations of the findings using PXR and CAR knockout mice. Using these knockout mice would demonstrate the extent which the regulation of IncRNAs are dependent on PXR and CAR under basal conditions. Previously, one study examined the species differences in gene regulation using human CAR transgenic mice as well as CAR-null mice (Cheng et al., 2017). This study showed that expression of Cyp3a11 and Cyp2b10 was up-regulated by TCPOBOP only in livers of WT mice but not in CAR-null mice. In a separate study, α-tocopherol was shown to be a PXR activator using wild-type and PXR-null mice. PXR-null compared to wildtype mice did not differ greatly in the regulated gene expression of the major P450s (Johnson et al., 2013). The purpose of the current study is to investigate those IncRNAs that are regulated by the pharmacological activation of PXR or CAR (similar to a toxicological response) as a first step. In future directions it will be important to determine the necessity of the nuclear receptors in modulating the constitutive IncRNA gene expression using knockout mice.

Another interesting finding is that the majority of the differentially regulated IncRNAs are produced within the intronic region of the PCGs (43%), followed by the intergenic regions (26.9%) and 3'-UTRs (14.5%) (Fig. 3B). Because only the mature mRNAs that are poly-A tailed are enriched, the intronic transcripts should be separate IncRNA fragments instead of nascent mRNA transcripts. suggests that the mammalian transcription machinery is highly efficient in that both IncRNAs and PCGs may share the same transcription machinery due to the relative genomic distributions. Intronic IncRNAs are known to initiate their transcription inside introns of PCGs in either direction and terminate without overlapping exons (Rinn and Chang, 2012). Little is known regarding the specific functions of intronic IncRNAs, although their potential involvement in cancer has been suggested (Tahira et al., 2011). Intergenic IncRNAs are encoded completely within intergenic regions between PCG loci and have been suggested to be more stable than intronic IncRNAs (Rinn and Chang, 2012). differential regulation of intergenic IncRNAs by PXR and CAR ligands indicates the importance of PXR and CAR genomic binding to the intergenic regions. Indeed, we have previously demonstrated that approximately 30% of PXRgenomic DNA binding are present in the intergenic regions (Cui et al., 2010b). CAR ChIP-Seq experiments are challenging due to lack of a good antibody targeting endogenous CAR protein, although one could overcome this technical challenge using an adenovirus-based system to direct the expression of YFP-CAR fusion constructs in transgenic mice (Niu et al., 2018). However, it seems reasonable to speculate that a substantial number of differentially regulated intergenic IncRNAs by TCPOBOP may be a result of direct CAR-binding to the intergenic regions. Last, IncRNAs produced from the 3'-UTR regions relative to PCGs may be important in protecting the mRNAs from miRNA-mediated degradation and/or inhibition of protein synthesis (Karapetyan et al., 2013; Dempsey and Cui, 2017). Although IncRNAs produced in distal regions may migrate to the 3'-UTRs of PCGs and perform similar functions, the local production of IncRNAs may have a special advantage in this process.

Regarding the potency of the two nuclear receptors, at the given dose, CAR activation by TCPOBOP differentially regulated more IncRNAs in liver than did PXR activation by PCN (Figure 1). Similarly, as we observed before, CAR activation also differentially regulated more PCGs than PXR activation (Cui and Klaassen, 2016). Therefore, it appears that TCPOBOP-mediated CAR activation is a highly potent stressor leading to an overall greater change in the mouse transcriptome. Among all of the differentially regulated PCGs that paired with IncRNAs, two pathways appeared to be affected the most by PXR and CAR activation. namely lipid metabolism (Figures 3C and 4C) proliferation/cancer (Supplemental Figures 1 and 2). Both nuclear receptors and certain IncRNAs have been implicated in these two pathways independently (Mo et al., 2016; Schmitt and Chang, 2016; Kong and Guo, 2018), whereas the present study is among the first to show that the biological outcomes (changes in lipid metabolism and cell proliferation status) mediated by PXR/CAR may be coregulated by IncRNAs. The PXR-mediated change in the lipid metabolism pathway is further supported by the motif analysis in that the PXR-targeted ChIP DNA from PCN-treated mouse livers had enrichment in the LRH-1 DNA binding motifs (Figure 4E). LRH-1 is an important orphan nuclear receptor that regulates cholesterol, bile acid, and steroid hormone synthesis (Lee et al., 2008). The PXR activation by PCN has also been shown to be important for regulating bile acid synthesis (Staudinger et al., 2001). Under basal conditions, there was no enrichment in LRH-1 DNA binding motifs; instead, the DNA-binding motifs for hnRNP2B1, which is involved in alternative splicing of pre-mRNAs, as well as RARα, which is a receptor for retinoic acid, were enriched (Fig. 5E).

Traditionally, PXR is considered a transcriptional activator for various drug metabolizing enzymes and efflux transporters. However, recent studies using ChIP-Seq and microarrays have suggested that increased PXR binding may result in either trans-activation or trans-suppression of bona fide PXR-targeted protein coding genes (Cui et al., 2010). The present study adds to the existing literature showing that the PXR-targeted IncRNA genes can also be further divided into inducible vs. suppressive gene batteries upon increased PXR binding. We propose two potential mechanisms for this phenomenon: 1) the coregulators that interact with PXR may ultimately determine the fate of PXR-target gene transcription. There is evidence in the literature showing that human PXR may interact with either a co-activator (e.g. SRC-1) or a co-repressor (e.g. SMRT or NCoR) (Navaratnarajah et al., 2012). Human PXR activity is repressed by the co-repressor silencing mediator of retinoid and thyroid hormone receptors (SMRT) (Johnson et al., 2006). 2) Another possibility is that PXR may compete with other trans-activators that are more important in the transcription of the target genes. Previous studies showed that PXR activation inhibits cAMP responsive element binding protein (CREB) and subsequently down-regulates the expression of rate-limiting enzymes for glucose homeostasis, such as glucose-6-phosphatase catalytic subunit (G6Pase) and phosphoenolpyruvate carboxykinase 1 (PEPCK1) (Kodama et al., 2007; Oh et al., 2013). In the present study, *in silico* analysis suggests that pharmacological activation of PXR is associated with increased nuclear occupancy of LRH-1 but decreased nuclear occupancy of RARα (Fig. 4E). This molecular switch may also contribute to the transcriptional silencing of a subset of PXR-targeted IncRNA genes. Additional studies using GST pull down assays as well as overlay between PXR cistrome and ChIP-Seq data of other transcription factors will verify our hypotheses.

Regarding the human relevance, it is known that both PXR and CAR both have species differences between mice and humans, especially their contribution in regulating cell proliferation (Kong and Guo, 2018; Niu et al., 2018). However, the regulation of IncRNAs may be more conserved between the two species, because it has been shown that IncRNA promoters are more conserved than IncRNA exons and almost as conserved as those of PCGs (Carninci et al., 2005; Guttman et al., 2009). In addition, there are greater species conservations and higher frequency of proximal binding by hepatic transcription factors in the liverenriched IncRNA gene promoters than PCG promoters (Yu et al., 2017). Therefore, it is reasonable to speculate that similar regulatory patterns of the IncRNAs may also be present in human livers following PXR and CAR activation.

The present study unveiled PCG-IncRNA pairs based on the positive associations of the neighboring PCG and IncRNAs following chemical exposure. Further mechanistic investigations are needed using IncRNA knockdown approach validate the dependency of IncRNAs the to in transcriptional/translational output of the paired PCGs. In humans, a recent study demonstrated that knocking down the neighboring IncRNAs produced from the antisense strand of the transcription factors HNF1α and HNF4α affected the expression of P450s in HepaRG cells (Chen et al., 2018). These observations have demonstrated the critical role of IncRNAs may play in modulating the PCG expression.

The rationale for the selection of H3K4me2, H3K27me3, and 5MeC over other epigenetic marks was that these marks were shown to associate with the regulation of important drug-processing genes in liver, as well as the focus of the present study on xenobiotic-sensing nuclear receptors (PXR and CAR). For example, the age-specific enrichment in H3K4me2 around the *Cyp3a* gene loci positively associates with the age-specific expression of the Cyp3a gene isoforms in mouse liver (Li et al., 2009). In addition, adult-specific enrichment of H3K4me2 positively associated with the adult-specific mRNA expression of other drug-processing genes including *glutathione S-transferase zeta 1* (*Gstz1*) (Cui et al., 2010a), *UDP glucuronosyltransferase 2 and 3* (*Ugt2* and *Ugt3*) (Choudhuri et al., 2010), as well as *Ahr* gene locus (Cui et al., 2009). Conversely, the presence of H3K27me3 was associated with the down-regulation of CYP1A2 mRNA in human embryonic stem cell-derived hepatocytes (hESC-Hep) and primary

human hepatocytes (Park et al., 2015). Regarding 5MeC, an investigation of DNA methylation in human liver samples demonstrated variable CpG hypermethylation of the CYP3A4 promoter region in adults, as well as in other CCAATenhancer-binding proteins (C/EBP) and HNF4α binding sites (Kacevska et al., 2012), indicating DNA methylation contributes to the regulation of CYP3A4 expression and the subsequent modifications in xenobiotic metabolism. It has also been suggested that methylation of gene bodies can serve as a novel therapeutic target for cancer treatment (Yang et al., 2014). Because many drugprocessing genes are known PXR and CAR targets, and the present study identified that many IncRNAs are also regulated by these drug receptors, the primary goal of the present study was to determine the interactions between these liver genes and the enrichment of these three epigenetic marks related to xenobiotic biotransformation. Many other epigenetic marks have been identified in the literature (Tan et al., 2011; Rivera and Ren, 2013), and it is important to investigate the involvement of these other marks in PXR- and CAR-mediated regulation of PCGs and IncRNAs in future studies.

Previously, it was demonstrated that the majority of IncRNAs share similar epigenetic marks at the promoter regions, such as H3K4me3 and RNA Pol-II binding sites as PCGs. However, a certain fraction of IncRNAs display a high prevalence of H3K4me1, which marks the enhancer region (Kashi et al., 2016). The present study adds to the evidence showing that a subset of mouse chromosomes (5, 12, and 15), H3K4me2, which marks the enhancers and actively transcribed gene bodies, is co-localized with PXR-DNA binding near the

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PCG-IncRNA gene loci, leading to active gene transcription. H3K4me2 may

provide a permissive chromatin environment for PXR-binding and the

subsequent gene transcription, and may serve as an important mechanism for

the co-expression of the PCG-lncRNA pairs.

Taken together, the present study is among the first to systemically

compare the PXR- and CAR-targeted IncRNA profiles in liver, and has provided

novel insights into the molecular mechanisms underlying the IncRNA gene

transcriptional regulation and potential biological outcomes in liver, and lay the

foundation for further decoding the mechanism of the regulation of the gene

transcription and the IncRNA-PCG networks in vivo.

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**AUTHORSHIP CONTRIBUTIONS** 

Participated in research design: Cui

Conducted experiments: Cui

Performed data analysis: Dempsey, Cui

Wrote or contributed to the writing of the manuscript: Dempsey, Cui

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### **REFERENCES**

Ananthanarayanan M (2016) A novel long noncoding RNA regulating cholesterol and bile acid homeostasis: A new kid on the block and a potential therapeutic target? *Hepatology* **64**:16-18.

Carninci P Kasukawa T Katayama S Gough J Frith MC Maeda N Oyama R Ravasi T Lenhard B Wells C Kodzius R Shimokawa K Bajic VB Brenner SE Batalov S Forrest AR Zavolan M Davis MJ Wilming LG Aidinis V Allen JE Ambesi-Impiombato A Apweiler R Aturaliya RN Bailey TL Bansal M Baxter L Beisel KW Bersano T Bono H Chalk AM Chiu KP Choudhary V Christoffels A Clutterbuck DR Crowe ML Dalla E Dalrymple BP de Bono B Della Gatta G di Bernardo D Down T Engstrom P Fagiolini M Faulkner G Fletcher CF Fukushima T Furuno M Futaki S Gariboldi M Georgii-Hemming P Gingeras TR Gojobori T Green RE Gustincich S Harbers M Hayashi Y Hensch TK Hirokawa N Hill D Huminiecki L lacono M Ikeo K Iwama A Ishikawa T Jakt M Kanapin A Katoh M Kawasawa Y Kelso J Kitamura H Kitano H Kollias G Krishnan SP Kruger A Kummerfeld SK Kurochkin IV Lareau LF Lazarevic D Lipovich L Liu J Liuni S McWilliam S Madan Babu M Madera M Marchionni L Matsuda H Matsuzawa S Miki H Mignone F Miyake S Morris K Mottagui-Tabar S Mulder N Nakano N Nakauchi H Ng P Nilsson R Nishiguchi S Nishikawa S Nori F Ohara O Okazaki Y Orlando V Pang KC Pavan WJ Pavesi G Pesole G Petrovsky N Piazza S Reed J Reid JF Ring BZ Ringwald M Rost B Ruan Y Salzberg SL Sandelin A Schneider C Schonbach C Sekiguchi K Semple CA Seno S Sessa L Sheng Y Shibata Y Shimada H Shimada K Silva D Sinclair B Sperling S Stupka E Sugiura K Sultana R Takenaka Y Taki K Tammoja K Tan SL Tang S Taylor MS Tegner J Teichmann SA Ueda HR van Nimwegen E Verardo R Wei CL Yagi K Yamanishi H Zabarovsky E Zhu S Zimmer A Hide W Bult C Grimmond SM Teasdale RD Liu ET Brusic V Quackenbush J Wahlestedt C Mattick JS Hume DA Kai C Sasaki D Tomaru Y Fukuda S Kanamori-Katayama M Suzuki M Aoki J Arakawa T lida J Imamura K Itoh M Kato T Kawaji H Kawagashira N Kawashima T Kojima M Kondo S Konno H Nakano K Ninomiya N Nishio T Okada M Plessy C Shibata K Shiraki T Suzuki S Tagami M Waki K Watahiki A Okamura-Oho Y Suzuki H Kawai J Hayashizaki Y Consortium F Group RGER and Genome Science G (2005) The transcriptional landscape of the mammalian genome. *Science* 309:1559-1563.

- Chen L, Bao Y, Piekos SC, Zhu K, Zhang L, and Zhong XB (2018) A Transcriptional Regulatory Network Containing Nuclear Receptors and Long Noncoding RNAs Controls Basal and Drug-Induced Expression of Cytochrome P450s in HepaRG Cells. *Mol Pharmacol* **94**:749-759.
- Chen Y, Huang H, Xu C, Yu C, and Li Y (2017) Long Non-Coding RNA Profiling in a Non-Alcoholic Fatty Liver Disease Rodent Model: New Insight into Pathogenesis. *Int J Mol Sci* **18**.
- Chen Z (2016) Progress and prospects of long noncoding RNAs in lipid homeostasis. *Mol Metab* **5:**164-170.

- Cheng J, Kapranov P, Drenkow J, Dike S, Brubaker S, Patel S, Long J, Stern D, Tammana H, Helt G, Sementchenko V, Piccolboni A, Bekiranov S, Bailey DK, Ganesh M, Ghosh S, Bell I, Gerhard DS, and Gingeras TR (2005a) Transcriptional maps of 10 human chromosomes at 5-nucleotide resolution. *Science* 308:1149-1154.
- Cheng SL, Bammler TK, and Cui JY (2017) RNA Sequencing Reveals Age and Species Differences of Constitutive Androstane Receptor-Targeted Drug-Processing Genes in the Liver. *Drug Metab Dispos* **45**:867-882.
- Cheng X, Maher J, Dieter MZ, and Klaassen CD (2005b) Regulation of mouse organic anion-transporting polypeptides (Oatps) in liver by prototypical microsomal enzyme inducers that activate distinct transcription factor pathways. *Drug Metab Dispos* **33**:1276-1282.
- Choudhuri S, Cui Y, and Klaassen CD (2010) Molecular targets of epigenetic regulation and effectors of environmental influences. *Toxicol Appl Pharmacol* **245**:378-393.
- Coleman-Derr D and Zilberman D (2012) DNA methylation, H2A.Z, and the regulation of constitutive expression. *Cold Spring Harb Symp Quant Biol* **77:**147-154.
- Consortium EP (2012) An integrated encyclopedia of DNA elements in the human genome. *Nature* **489**:57-74.
- Cui JY, Choudhuri S, Knight TR, and Klaassen CD (2010a) Genetic and epigenetic regulation and expression signatures of glutathione S-transferases in developing mouse liver. *Toxicol Sci* **116**:32-43.

- Cui JY, Gunewardena SS, Rockwell CE, and Klaassen CD (2010b) ChlPing the cistrome of PXR in mouse liver. *Nucleic Acids Res* **38**:7943-7963.
- Cui JY and Klaassen CD (2016) RNA-Seq reveals common and unique PXRand CAR-target gene signatures in the mouse liver transcriptome. *Biochim Biophys Acta* **1859**:1198-1217.
- Cui YJ, Yeager RL, Zhong XB, and Klaassen CD (2009) Ontogenic expression of hepatic Ahr mRNA is associated with histone H3K4 di-methylation during mouse liver development. *Toxicol Lett* **189**:184-190.
- Dempsey JL and Cui JY (2017) Long Non-Coding RNAs: A Novel Paradigm for Toxicology. *Toxicol Sci* **155:**3-21.
- Djebali S, Davis CA, Merkel A, Dobin A, Lassmann T, Mortazavi A, Tanzer A, Lagarde J, Lin W, Schlesinger F, Xue C, Marinov GK, Khatun J, Williams BA, Zaleski C, Rozowsky J, Roder M, Kokocinski F, Abdelhamid RF, Alioto T, Antoshechkin I, Baer MT, Bar NS, Batut P, Bell K, Bell I, Chakrabortty S, Chen X, Chrast J, Curado J, Derrien T, Drenkow J, Dumais E, Dumais J, Duttagupta R, Falconnet E, Fastuca M, Fejes-Toth K, Ferreira P, Foissac S, Fullwood MJ, Gao H, Gonzalez D, Gordon A, Gunawardena H, Howald C, Jha S, Johnson R, Kapranov P, King B, Kingswood C, Luo OJ, Park E, Persaud K, Preall JB, Ribeca P, Risk B, Robyr D, Sammeth M, Schaffer L, See LH, Shahab A, Skancke J, Suzuki AM, Takahashi H, Tilgner H, Trout D, Walters N, Wang H, Wrobel J, Yu Y, Ruan X, Hayashizaki Y, Harrow J, Gerstein M, Hubbard T, Reymond A, Antonarakis SE, Hannon G, Giddings MC, Ruan Y, Wold B, Carninci P,

- Guigo R, and Gingeras TR (2012) Landscape of transcription in human cells. *Nature* **489:**101-108.
- Engreitz JM, Haines JE, Perez EM, Munson G, Chen J, Kane M, McDonel PE, Guttman M, and Lander ES (2016) Local regulation of gene expression by IncRNA promoters, transcription and splicing. *Nature* **539**:452-455.
- Furuno M, Pang KC, Ninomiya N, Fukuda S, Frith MC, Bult C, Kai C, Kawai J, Carninci P, Hayashizaki Y, Mattick JS, and Suzuki H (2006) Clusters of internally primed transcripts reveal novel long noncoding RNAs. *PLoS Genet* **2**:e37.
- Gao J and Xie W (2010) Pregnane X receptor and constitutive androstane receptor at the crossroads of drug metabolism and energy metabolism.

  \*Drug Metab Dispos 38:2091-2095.\*\*
- Geisler S and Coller J (2013) RNA in unexpected places: long non-coding RNA functions in diverse cellular contexts. *Nat Rev Mol Cell Biol* **14:**699-712.
- Goyal N, Sivadas A, Shamsudheen KV, Jayarajan R, Verma A, Sivasubbu S, Scaria V, and Datta M (2017) RNA sequencing of db/db mice liver identifies IncRNA H19 as a key regulator of gluconeogenesis and hepatic glucose output. *Sci Rep* **7**:8312.
- Grimaldi G, Rajendra S, and Matthews J (2018) The aryl hydrocarbon receptor regulates the expression of TIPARP and its cis long non-coding RNA, TIPARP-AS1. *Biochem Biophys Res Commun* **495**:2356-2362.
- Guttman M, Amit I, Garber M, French C, Lin MF, Feldser D, Huarte M, Zuk O, Carey BW, Cassady JP, Cabili MN, Jaenisch R, Mikkelsen TS, Jacks T,

- Hacohen N, Bernstein BE, Kellis M, Regev A, Rinn JL, and Lander ES (2009) Chromatin signature reveals over a thousand highly conserved large non-coding RNAs in mammals. *Nature* **458**:223-227.
- Handschin C and Meyer UA (2003) Induction of drug metabolism: the role of nuclear receptors. *Pharmacol Rev* **55:**649-673.
- Ingelman-Sundberg M, Zhong XB, Hankinson O, Beedanagari S, Yu AM, Peng L, and Osawa Y (2013) Potential role of epigenetic mechanisms in the regulation of drug metabolism and transport. *Drug Metab Dispos* **41**:1725-1731.
- Johnson CH, Bonzo JA, Cheng J, Krausz KW, Kang DW, Luecke H, Idle JR, and Gonzalez FJ (2013) Cytochrome P450 regulation by alpha-tocopherol in Pxr-null and PXR-humanized mice. *Drug Metab Dispos* **41**:406-413.
- Kacevska M, Ivanov M, Wyss A, Kasela S, Milani L, Rane A, and Ingelman-Sundberg M (2012) DNA methylation dynamics in the hepatic CYP3A4 gene promoter. *Biochimie* **94:**2338-2344.
- Kapranov P, St Laurent G, Raz T, Ozsolak F, Reynolds CP, Sorensen PH, Reaman G, Milos P, Arceci RJ, Thompson JF, and Triche TJ (2010) The majority of total nuclear-encoded non-ribosomal RNA in a human cell is 'dark matter' un-annotated RNA. *BMC Biol* **8:**149.
- Karapetyan AR, Buiting C, Kuiper RA, and Coolen MW (2013) Regulatory Roles for Long ncRNA and mRNA. *Cancers (Basel)* **5:**462-490.
- Karlsson O and Baccarelli AA (2016) Environmental Health and Long Non-coding RNAs. *Curr Environ Health Rep* **3:**178-187.

- Kashi K, Henderson L, Bonetti A, and Carninci P (2016) Discovery and functional analysis of IncRNAs: Methodologies to investigate an uncharacterized transcriptome. *Biochim Biophys Acta* **1859**:3-15.
- Kim T, Xu Z, Clauder-Munster S, Steinmetz LM, and Buratowski S (2012) Set3 HDAC mediates effects of overlapping noncoding transcription on gene induction kinetics. Cell 150:1158-1169.
- Kiyosawa N, Kwekel JC, Burgoon LD, Dere E, Williams KJ, Tashiro C, Chittim B, and Zacharewski TR (2008) Species-specific regulation of PXR/CAR/ER-target genes in the mouse and rat liver elicited by o, p'-DDT. *BMC Genomics* **9:**487.
- Kliewer SA, Goodwin B, and Willson TM (2002) The nuclear pregnane X receptor: a key regulator of xenobiotic metabolism. *Endocr Rev* **23:**687-702.
- Kodama S, Moore R, Yamamoto Y, and Negishi M (2007) Human nuclear pregnane X receptor cross-talk with CREB to repress cAMP activation of the glucose-6-phosphatase gene. *Biochem J* **407:**373-381.
- Kong B and Guo GL (2018) Is this the time to reconsider the names for xenobiotic nuclear receptors? *Hepatology*.
- Kung JT, Colognori D, and Lee JT (2013) Long noncoding RNAs: past, present, and future. *Genetics* **193:**651-669.
- Lan X, Yan J, Ren J, Zhong B, Li J, Li Y, Liu L, Yi J, Sun Q, Yang X, Sun J, Meng L, Zhu W, Holmdahl R, Li D, and Lu S (2016) A novel long noncoding RNA

- Lnc-HC binds hnRNPA2B1 to regulate expressions of Cyp7a1 and Abca1 in hepatocytic cholesterol metabolism. *Hepatology* **64:**58-72.
- Lee YK, Schmidt DR, Cummins CL, Choi M, Peng L, Zhang Y, Goodwin B, Hammer RE, Mangelsdorf DJ, and Kliewer SA (2008) Liver receptor homolog-1 regulates bile acid homeostasis but is not essential for feedback regulation of bile acid synthesis. *Mol Endocrinol* **22**:1345-1356.
- Lempiainen H, Couttet P, Bolognani F, Muller A, Dubost V, Luisier R, Del Rio Espinola A, Vitry V, Unterberger EB, Thomson JP, Treindl F, Metzger U, Wrzodek C, Hahne F, Zollinger T, Brasa S, Kalteis M, Marcellin M, Giudicelli F, Braeuning A, Morawiec L, Zamurovic N, Langle U, Scheer N, Schubeler D, Goodman J, Chibout SD, Marlowe J, Theil D, Heard DJ, Grenet O, Zell A, Templin MF, Meehan RR, Wolf RC, Elcombe CR, Schwarz M, Moulin P, Terranova R, and Moggs JG (2013) Identification of Dlk1-Dio3 imprinted gene cluster noncoding RNAs as novel candidate biomarkers for liver tumor promotion. *Toxicol Sci* **131**:375-386.
- Li D, Cheng M, Niu Y, Chi X, Liu X, Fan J, Fan H, Chang Y, and Yang W (2017)

  Identification of a novel human long non-coding RNA that regulates hepatic lipid metabolism by inhibiting SREBP-1c. *Int J Biol Sci* **13**:349-357.
- Li P, Ruan X, Yang L, Kiesewetter K, Zhao Y, Luo H, Chen Y, Gucek M, Zhu J, and Cao H (2015) A liver-enriched long non-coding RNA, IncLSTR, regulates systemic lipid metabolism in mice. *Cell Metab* **21**:455-467.

- Li Y, Cui Y, Hart SN, Klaassen CD, and Zhong XB (2009) Dynamic patterns of histone methylation are associated with ontogenic expression of the Cyp3a genes during mouse liver maturation. *Mol Pharmacol* **75**:1171-1179.
- Lodato NJ, Rampersaud A, and Waxman DJ (2018) Impact of CAR Agonist Ligand TCPOBOP on Mouse Liver Chromatin Accessibility. *Toxicol Sci* **164:**115-128.
- Mackowiak B, Hodge J, Stern S, and Wang H (2018) The Roles of Xenobiotic Receptors: Beyond Chemical Disposition. *Drug Metab Dispos* **46:**1361-1371.
- Maher JM, Cheng X, Slitt AL, Dieter MZ, and Klaassen CD (2005) Induction of the multidrug resistance-associated protein family of transporters by chemical activators of receptor-mediated pathways in mouse liver. *Drug Metab Dispos* **33:**956-962.
- Mo L, Shen J, Liu Q, Zhang Y, Kuang J, Pu S, Cheng S, Zou M, Jiang W, Jiang C, Qu A, and He J (2016) Irisin Is Regulated by CAR in Liver and Is a Mediator of Hepatic Glucose and Lipid Metabolism. *Mol Endocrinol* **30:**533-542.
- Moore JT, Moore LB, Maglich JM, and Kliewer SA (2003) Functional and structural comparison of PXR and CAR. *Biochim Biophys Acta* **1619**:235-238.

- Niu B, Coslo DM, Bataille AR, Albert I, Pugh BF, and Omiecinski CJ (2018) In vivo genome-wide binding interactions of mouse and human constitutive androstane receptors reveal novel gene targets. *Nucleic Acids Res*.
- Oh KJ, Han HS, Kim MJ, and Koo SH (2013) CREB and FoxO1: two transcription factors for the regulation of hepatic gluconeogenesis. *BMB Rep* **46:**567-574.
- Orom UA, Derrien T, Beringer M, Gumireddy K, Gardini A, Bussotti G, Lai F, Zytnicki M, Notredame C, Huang Q, Guigo R, and Shiekhattar R (2010) Long noncoding RNAs with enhancer-like function in human cells. *Cell* **143**:46-58.
- Oshida K, Vasani N, Thomas RS, Applegate D, Gonzalez FJ, Aleksunes LM, Klaassen CD, and Corton JC (2015) Screening a mouse liver gene expression compendium identifies modulators of the aryl hydrocarbon receptor (AhR). *Toxicology* **336**:99-112.
- Pacyniak EK, Cheng X, Cunningham ML, Crofton K, Klaassen CD, and Guo GL (2007) The flame retardants, polybrominated diphenyl ethers, are pregnane X receptor activators. *Toxicol Sci* **97**:94-102.
- Pan JJ, Xie XJ, Li X, and Chen W (2015) Long Non-coding RNAs and Drug Resistance. *Asian Pac J Cancer Prev* **16:**8067-8073.
- Park HJ, Choi YJ, Kim JW, Chun HS, Im I, Yoon S, Han YM, Song CW, and Kim H (2015) Differences in the Epigenetic Regulation of Cytochrome P450 Genes between Human Embryonic Stem Cell-Derived Hepatocytes and Primary Hepatocytes. *PLoS One* **10**:e0132992.

- Peng L, Paulson A, Li H, Piekos S, He X, Li L, and Zhong XB (2014)

  Developmental programming of long non-coding RNAs during postnatal liver maturation in mice. *PLoS One* **9**:e114917.
- Poulin-Dubois D and Shultz TR (1990) The infant's concept of agency: the distinction between social and nonsocial objects. *J Genet Psychol* **151:77**-90.
- Pratt-Hyatt M, Lickteig AJ, and Klaassen CD (2013) Tissue distribution, ontogeny, and chemical induction of aldo-keto reductases in mice. *Drug Metab Dispos* **41:**1480-1487.
- Pu S, Wu X, Yang X, Zhang Y, Dai Y, Zhang Y, Wu X, Liu Y, Cui X, Jin H, Cao J, Li R, Cai J, Cao Q, Hu L, and Gao Y (2018) The Therapeutic Role of Xenobiotic Nuclear Receptors against Metabolic Syndrome. *Curr Drug Metab*.
- Recio L, Phillips SL, Maynor T, Waters M, Jackson AF, and Yauk CL (2013)

  Differential expression of long noncoding RNAs in the livers of female

  B6C3F1 mice exposed to the carcinogen furan. *Toxicol Sci* **135**:369-379.
- Rinn JL and Chang HY (2012) Genome regulation by long noncoding RNAs.

  Annu Rev Biochem 81:145-166.
- Rivera CM and Ren B (2013) Mapping human epigenomes. Cell 155:39-55.
- Schmitt AM and Chang HY (2016) Long Noncoding RNAs in Cancer Pathways.

  \*Cancer Cell 29:452-463.\*\*
- St Laurent G, Wahlestedt C, and Kapranov P (2015) The Landscape of long noncoding RNA classification. *Trends Genet* **31**:239-251.

- Staudinger J, Liu Y, Madan A, Habeebu S, and Klaassen CD (2001) Coordinate regulation of xenobiotic and bile acid homeostasis by pregnane X receptor. *Drug Metab Dispos* **29**:1467-1472.
- Tahira AC, Kubrusly MS, Faria MF, Dazzani B, Fonseca RS, Maracaja-Coutinho V, Verjovski-Almeida S, Machado MC, and Reis EM (2011) Long noncoding intronic RNAs are differentially expressed in primary and metastatic pancreatic cancer. *Mol Cancer* 10:141.
- Tan M, Luo H, Lee S, Jin F, Yang JS, Montellier E, Buchou T, Cheng Z, Rousseaux S, Rajagopal N, Lu Z, Ye Z, Zhu Q, Wysocka J, Ye Y, Khochbin S, Ren B, and Zhao Y (2011) Identification of 67 histone marks and histone lysine crotonylation as a new type of histone modification. *Cell* 146:1016-1028.
- Villegas VE and Zaphiropoulos PG (2015) Neighboring gene regulation by antisense long non-coding RNAs. *Int J Mol Sci* **16**:3251-3266.
- Vyhlidal CA, Bi C, Ye SQ, and Leeder JS (2016) Dynamics of Cytosine Methylation in the Proximal Promoters of CYP3A4 and CYP3A7 in Pediatric and Prenatal Livers. *Drug Metab Dispos* **44**:1020-1026.
- Wada T, Gao J, and Xie W (2009) PXR and CAR in energy metabolism. *Trends*Endocrinol Metab **20**:273-279.
- Willson TM and Kliewer SA (2002) PXR, CAR and drug metabolism. *Nat Rev Drug Discov* **1:**259-266.

- Yang L, Li P, Yang W, Ruan X, Kiesewetter K, Zhu J, and Cao H (2016)
  Integrative Transcriptome Analyses of Metabolic Responses in Mice
  Define Pivotal LncRNA Metabolic Regulators. *Cell Metab* **24**:627-639.
- Yang X, Han H, De Carvalho DD, Lay FD, Jones PA, and Liang G (2014) Gene body methylation can alter gene expression and is a therapeutic target in cancer. *Cancer Cell* **26**:577-590.
- Yu AM, Ingelman-Sundberg M, Cherrington NJ, Aleksunes LM, Zanger UM, Xie W, Jeong H, Morgan ET, Turnbaugh PJ, Klaassen CD, Bhatt AP, Redinbo MR, Hao P, Waxman DJ, Wang L, and Zhong XB (2017) Regulation of drug metabolism and toxicity by multiple factors of genetics, epigenetics, IncRNAs, gut microbiota, and diseases: a meeting report of the 21(st) International Symposium on Microsomes and Drug Oxidations (MDO). *Acta Pharm Sin B* **7**:241-248.
- Zhang L, Yang Z, Trottier J, Barbier O, and Wang L (2017) Long noncoding RNA MEG3 induces cholestatic liver injury by interaction with PTBP1 to facilitate shp mRNA decay. *Hepatology* **65**:604-615.
- Zhao Y, Wu J, Liangpunsakul S, and Wang L (2017) Long Non-coding RNA in Liver Metabolism and Disease: Current Status. *Liver Res* **1:**163-167.

DMD # 85142

**FOOTNOTE** 

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Murphy Endowment.

FIGURE LEGENDS

Figure 1. Number of IncRNAs that were not expressed (or not detected using the

poly-A selection method) and expressed in liver. A IncRNA is considered to be

expressed in liver if the average FPKM is above 1 in at least one exposure

groups (corn oil, PCN, or TCPOBOP). Among the liver-expressed lncRNAs, the

percentages of IncRNAs that were not differentially regulated, increased, or

decreased by chemical exposure were calculated and displayed as two pie

charts (PCN and TCPOBOP). Differential expression was considered at p < 0.05

(Cuffdiff).

Figure 2. A. Common and unique IncRNA targets following PCN and TCPOBOP

exposure in mouse liver (p < 0.05 as determined by Cuffdiff). **B.** A hierarchical

clustering dendrogram showing the relative expression patterns of IncRNAs in

liver in corn oil, PCN, and TCPOBOP exposed conditions. Data were

standardized and are expressed as z-scores.

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Figure 3. A. Number of IncRNAs that paired with PCGs or not paired with PCGs following PCN exposure. A IncRNA-PCG gene pair is defined as: 1) the IncRNA gene overlaps with or is within 5 kb upstream of transcription start sites (TSS) or 1 kb downstream of transcription termination sites (TTS) of any PCG and 2) both the IncRNA and the proximal PCG were differentially expressed by PCN exposure (average FPKM > 1 and p < 0.05). **B.** Genomic annotation of PCNregulated IncRNAs (p < 0.05) relative to the PCGs. Data were analyzed using PAVIS. C. Number of IncRNAs that paired with PCGs or not paired with PCGs following TCPOBOP exposure. A IncRNA-PCG gene pair is defined as: 1) the IncRNA gene overlaps with or is within 5 kb upstream of transcription start sites (TSS) or 1 kb downstream of transcription termination sites (TTS) of any PCG and 2) both the IncRNA and the proximal PCG were differentially expressed by PCN exposure (average FPKM > 1 and p < 0.05). **D.** Genomic annotation of TCPOBOP-regulated IncRNAs (p < 0.05) relative to the PCGs. analyzed using PAVIS.

**Figure 4. A.** Number of PXR-DNA binding sites within ±10 kb of IncRNA gene loci in corn oil and PCN exposed conditions. **B.** Cumulatively PXR-DNA binding fold enrichment within ±10 kb of IncRNA gene loci in corn oil and PCN exposed conditions. **C.** Percentages of induced IncRNA gene battery by PCN that had no PXR binding, no change in PXR binding, increase in PXR binding, and decreased PXR binding following PCN exposure. **D.** Percentages of decreased IncRNA gene battery by PCN that had no PXR binding, no change in PXR

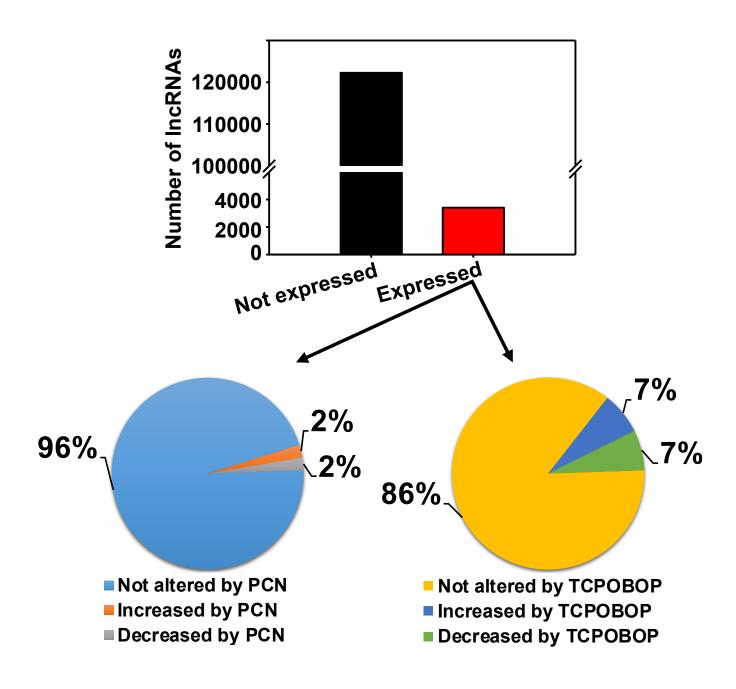
binding, increase in PXR binding, and decreased PXR binding following PCN exposure. **E.** Homer *de novo* motif analysis of PXR-DNA binding intervals in corn oil and PCN exposed groups using findMotifsGenome.pl. Data were reanalyzed from the PXR ChIP-Seq dataset as described in MATERIALS AND METHODS.

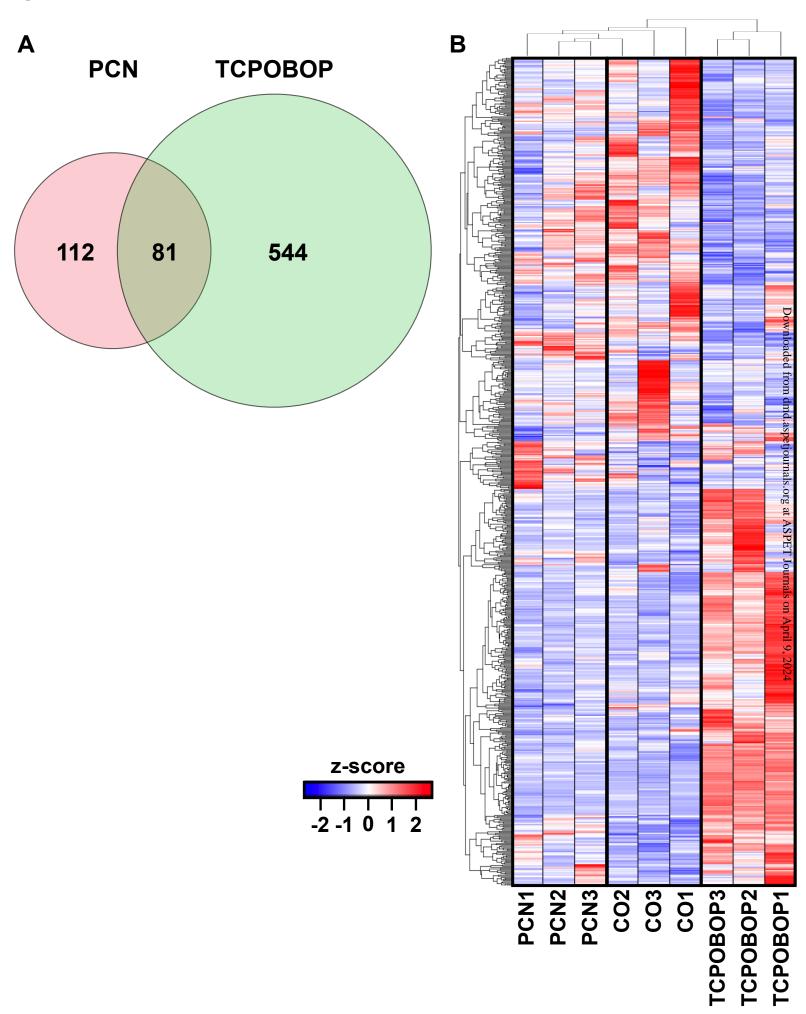
Figure 5. A. Co-localization of PXR and H3K4me2 around the IncRNA NONMMUG034025.2 and the paired PCG Por gene loci. Integrated Genome Viewer (IGV) is a high performance visualization tool for displaying and exploring large datasets including RNA-Seq data, and can be accessed http://software.broadinstitute.org/software/igv/. The genomic locations of IncRNA and PCG are visualized by IGV. Asterisks represent statistically significant differences as compared to corn oil control group (p < 0.05, Cuffdiff). FPKM: Fragments Per Kilobase of transcript per Million mapped reads, which is a unit to express RNA abundance from the RNA-Seq data. Data from RNA-Seq (corn oil and PCN exposed groups), ChIP-Seq (for PXR-DNA binding in corn oil and PCN exposed conditions), and ChIP-on-chip (for H3K4me2, H3K27me3, and 5MeC on mouse chormosomes 5, 12, and 15) were integrated as described in MATERIALS AND METHODS. **B.** Co-localization of PXR and H3K4me2 around the intergenic IncRNA NONMMUG014541.1 gene locus. The genomic location of IncRNA and PCG is visualized by IGV. Asterisks represent statistically significant differences as compared to corn oil control group (p < 0.05, Cuffdiff). Data from RNA-Seq (corn oil and PCN exposed groups), ChIP-Seq (for PXR- DMD # 85142

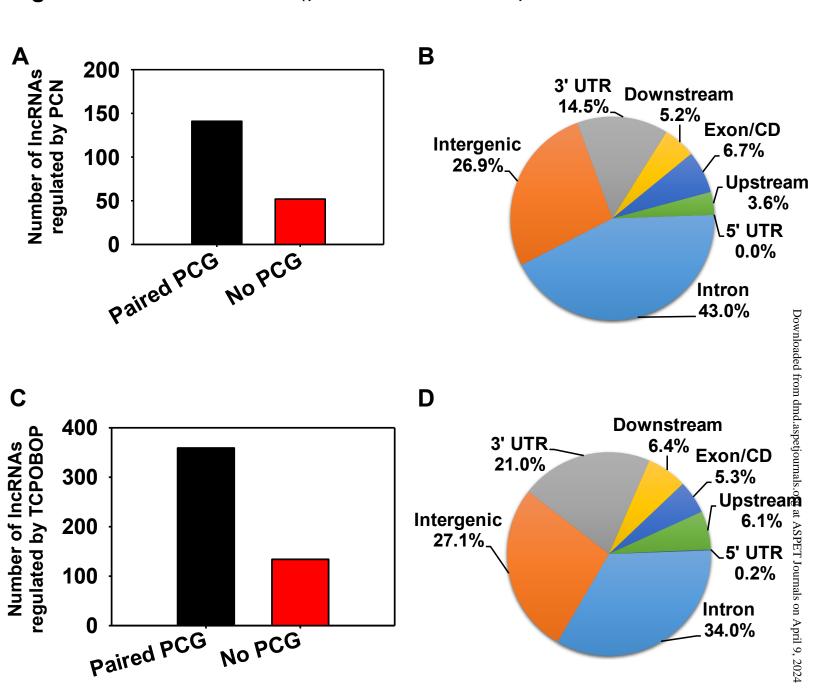
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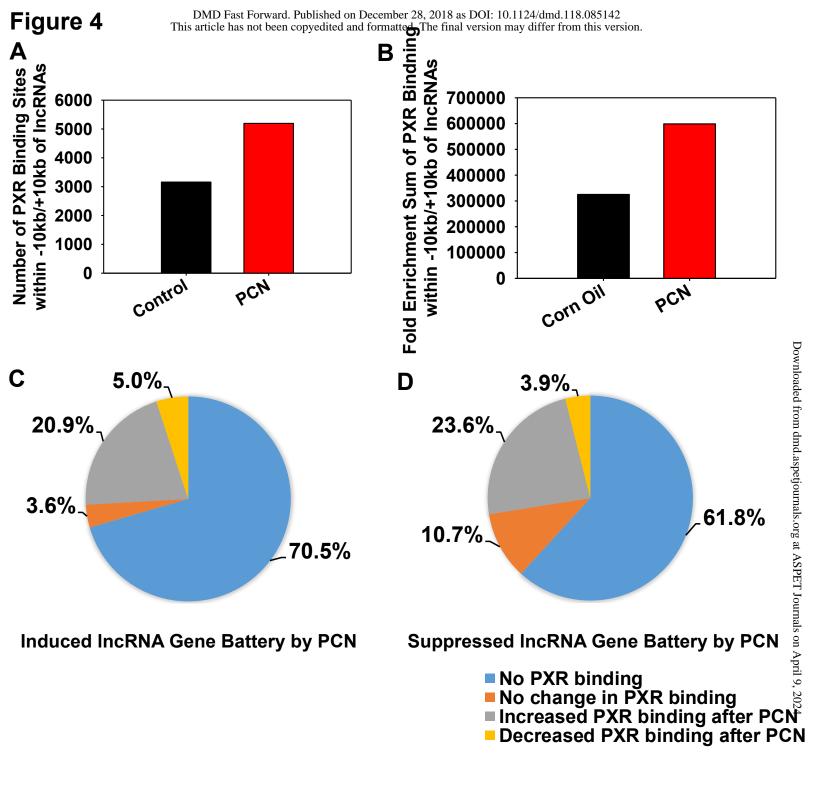
DNA binding in corn oil and PCN exposed conditions), and ChIP-on-chip (for H3K4me2, H3K27me3, and 5MeC on mouse chormosomes 5, 12, and 15) were integrated as described in MATERIALS AND METHODS.

**Figure 6.** Examples of hepatic IncRNAs that were up-regulated (**A**) or down-regulated (**B**) by TCPOBOP (which are consistent with the literature report (Lodato et al., 2018). The effect of PCN on these CAR-targeted IncRNAs is also shown. Asterisks represent statistically significant differences as compared to the corn oil group (p < 0.05, Cufdiff). FPKM: Fragments Per Kilobase of transcript per Million mapped reads, which is a unit to express RNA abundance from the RNA-Seq data.









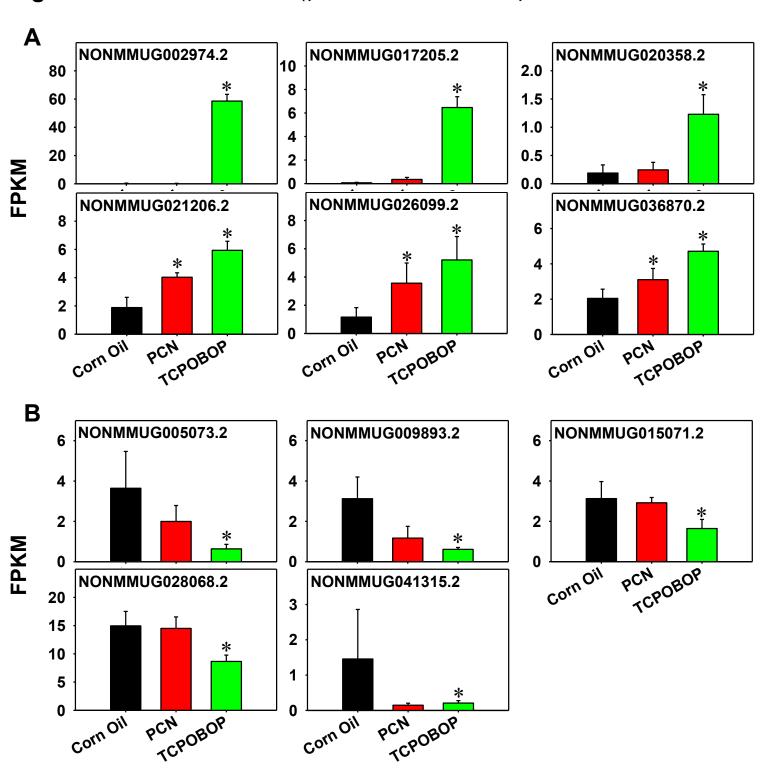
### E. Homer de novo Motif Analysis

#### **Corn Oil**

Ra	nk Motif	P-value		% of Targets	% of Background	STD(Bg STD)	Best Match/Details
1	<b>GGGCFGTCCCTA</b>	1e-13	-3.001e+01	13.04%	0.23%	(54.3bp)	HNRNPA2B1(RRM)/Homo_sapiens-RNCMPT00024-PBM/HughesRNA (0.746) More Information   Similar Motifs Found
2	<b>ESASASASTICA</b>	1e-12	-2.801e+01	34.78%			RARa(NR)/K562-RARa-ChIP-Seq(Encode)/Homer(0.662)  More Information   Similar Motifs Found

#### **PCN**

Rank	Motif	P-value	log P-pvalue	% of Targets	% of Background	STD(Bg STD)	Best Match/Details
1	<b>TTGGCCTTGGAC</b>	1e-13	-3.120e+01	10.00%	0.15%	57.5bp (65.4bp)	Nr5a2/MA0505.1/Jaspar(0.811) More Information   Similar Motifs Found



**Supplemental Materials** 

**Article title:** Regulation of Hepatic Long Non-coding RNAs by PXR and CAR Agonists

in Mouse Liver

**Authors:** Joseph L. Dempsey and Julia Yue Cui

**Journal title:** Drug Metabolism and Disposition

Legend for supplemental materials:

**Supplemental Figure 1.** Additional network associated with PCGs that paired with

IncRNAs following PCN exposure: cellular growth and proliferation. Data were analyzed

using Ingenuity Pathway Analysis (IPA). Red represents up-regulated genes; green

represents down-regulated genes.

**Supplemental Figure 2.** Additional network associated with PCGs that paired with

IncRNAs following TCPOBOP exposure: cancer injury. Data were analyzed using

Ingenuity Pathway Analysis (IPA). Red represents up-regulated genes; green

represents down-regulated genes.

Supplemental Figure 3. Homer known motif enrichment analysis of PXR-DNA binding

intervals in corn oil and PCN exposed groups using findMotifsGenome.pl. Data were

re-analyzed from the PXR ChIP-Seq dataset as described in MATERIALS AND

METHODS.

Supplemental Figure 4. Network associated with PCGs that paired with IncRNAs

following TCPOBOP exposure: cancer injury.

**Supplemental Figure 5.** Homer known motif enrichment in corn oil and PCN exposed groups.

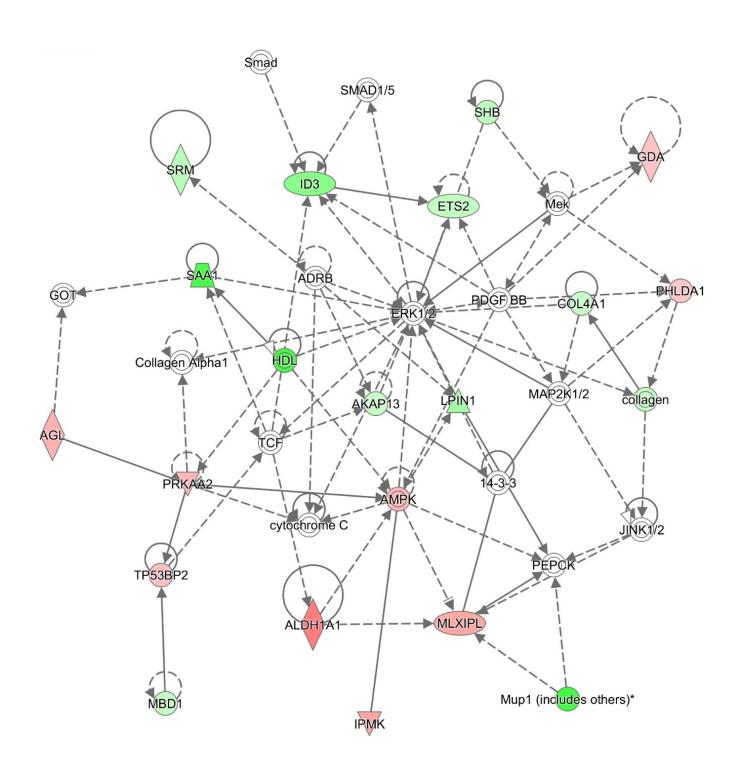
**Supplemental Figure 6.** Examples of co-localization between PXR-binding and the epigenetic mark H3K4me2 around IncRNA gene loci.

**Supplemental Table 1.** Liver-expressed IncRNAs that were differentially regulated by PCN and their genomic distance to PCGs.

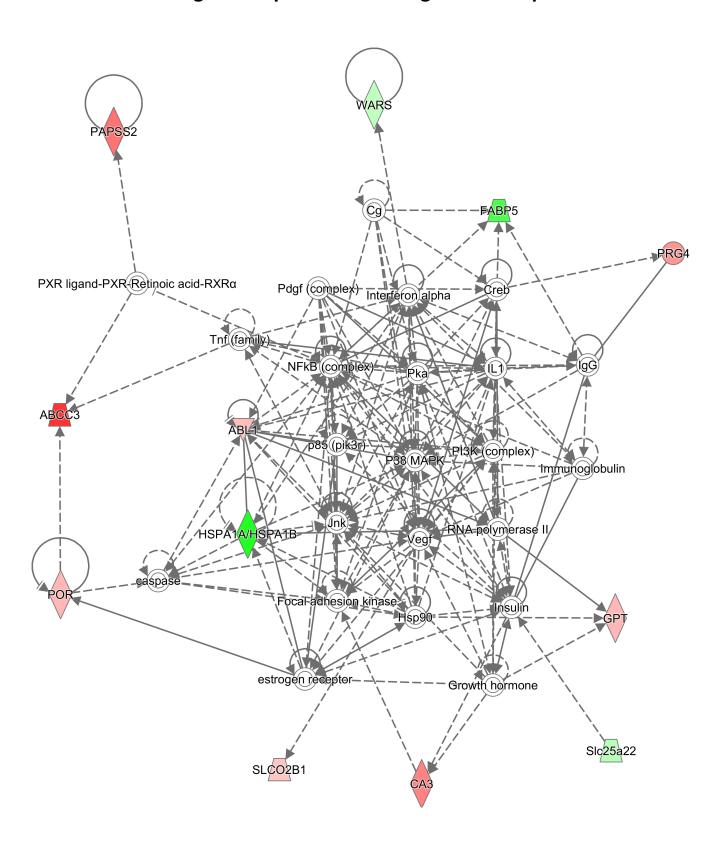
**Supplemental Table 2.** Liver-expressed IncRNAs that were differentially regulated by TCPOBOP and their genomic distance to PCGs.

**Supplemental Table 3.** Overlay between PXR-DNA binding and epigenetic marks around IncRNA gene loci on chromosomes 5, 12, and 15.

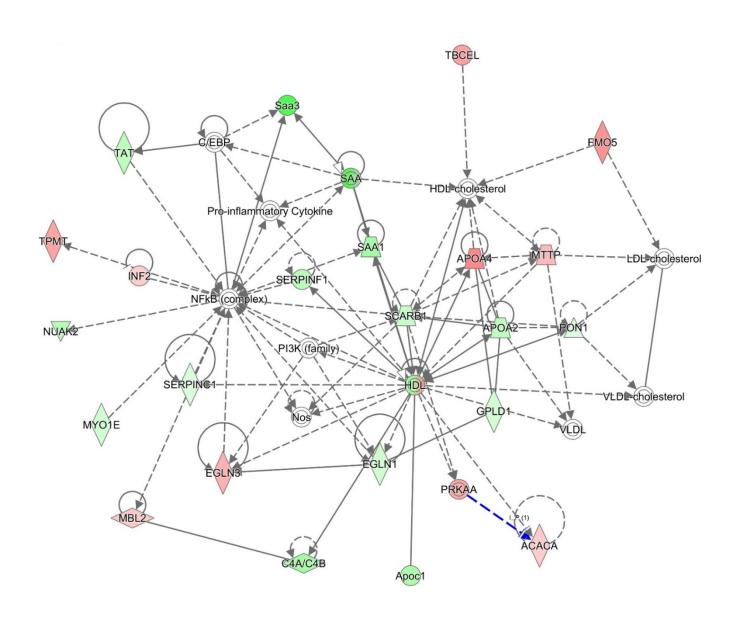
# Supplemental Figure 1. Network associated with PCGs that paired with IncRNAs following PCN exposure: lipid metabolism, molecular transport, and small molecular biochemistry



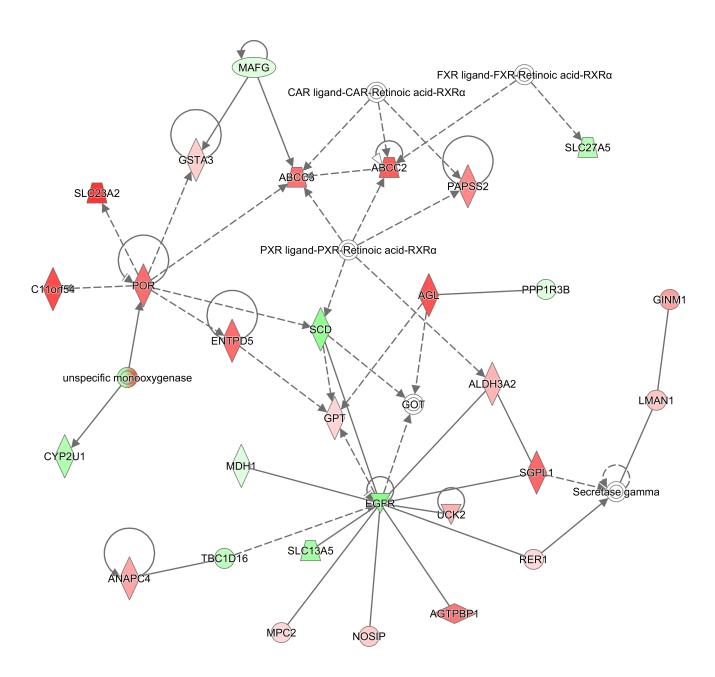
### Supplemental Figure 2. Network associated with PCGs that paired with IncRNAs following PCN exposure: cellular growth and proliferation



# Supplemental Figure 3. Network associated with PCGs that paired with IncRNAs following TCPOBOP exposure: lipid metabolism and molecular transport



## Supplemental Figure 4. Network associated with PCGs that paired with IncRNAs following TCPOBOP exposure: cancer injury



## **Supplemental Figure 5. Homer Known Motif Enrichment Corn Oil**

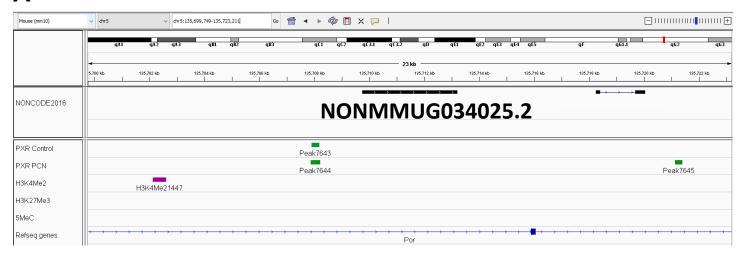
Rank Motif	Name	P-value	log P-pvalue	q-value (Benjamini)		% of Targets Sequences with Motif
· ESESAGGTCA	COUP-TFII(NR)/K562-NR2F1-ChIP-Seq(Encode)/Homer	le-10	-2.321e+01	0.0000	33.0	47.83%
<sup>2</sup> ITGASCIZEE	RARa(NR)/K562-RARa-ChIP-Seq(Encode)/Homer	le-9	-2.289e+01	0.0000	46.0	66.67%
» <b>EJACEICAAAGGICA</b>	PPARa(NR),DR1/Liver-Ppara-ChIP-Seq(GSE47954)/Homer	le-8	-1.922e+01	0.0000	26.0	37.68%
⁴ <b><u>&amp;&amp;&amp;GGTCA</u></b>	COUP-TFII(NR)/Artia-Nr2f2-ChIP-Seq(GSE46497)/Homer	le-8	-1.908e+01	0.0000	33.0	47.83%
· ATTGGGCAAG	CEBP(bZIP)/ThioMac-CEBPb-ChIP-Seq(GSE21512)/Homer	le-7	-1.620e+01	0.0000	16.0	23.19%
· ZSAGGICA	THRb(NR)/Liver-NR1A2-ChIP-Seq(GSE52613)/Homer	le-6	-1.572 <b>e</b> +01	0.0000	50.0	72.46%
<sup>,</sup>	EAR2(NR)/K562-NR2F6-ChIP-Seq(Encode)/Homer	le-6	-1.537e+01	0.0000	27.0	39.13%
· TGACCTTTGECCA	PPARE(NR),DR1/3T3L1-Pparg-ChIP-Seq(GSE13511)/Homer	le-6	-1.494e+01	0.0000	22.0	31.88%
· <u>Iaggęcaaaggica</u>	RXR(NR),DR1/3T3L1-RXR-ChIP-Seq(GSE13511)/Homer	le-6	-1.467e+01	0.0000	24.0	34.78%
10 <b>CAAAGGICA</b> S	Erra(NR)/HepG2-Erra-ChIP-Seq(GSE31477)/Homer	le-6	-1.398e+01	0.0001	35.0	50.72%
" GGICASSIGAGGICA	THRb(NR)/HepG2-THRb.Flag-ChIP-Seq(Encode)/Homer	le-5	-1.371e+01	0.0001	16.0	23.19%
<sup>12</sup> <b><u>§§§§ÇŞ</u>Ç<u>AAAG</u><u>T</u>ŞÇ<u>A</u></b>	HNF4a(NR),DR1/HepG2-HNF4a-ChIP-Seq(GSE25021)/Homer	le-5	-1.363e+01	0.0001	15.0	21.74%
B ESAGGICA SEGGGICATES	VDR(NR),DR3/GM10855-VDR+vitD-ChIP-Seq(GSE22484)/Homer	le-4	-1.033e+01	0.0024	8.0	11.59%
14 <b>STIAISJAAS</b>	HLF(bZIP)/HSC-HLF.Flag-ChIP-Seq(GSE69817)/Homer	le-4	-9.959e+00	0.0033	13.0	18.84%
15 <b>AAACA</b>	FOXA1(Forkhead)/LNCAP-FOXA1-ChIP-Seq(GSE27824)/Homer	le-3	-9.154e+00	0.0069	17.0	24.64%
16 <b>EEEECTGIGIAAACA</b> EE	Fox:Ebox(Forkhead,bHLH)/Pancl-Foxa2-ChIP-Seq(GSE47459)/Homer	le-3	-9.040e+00	0.0072	17.0	24.64%
17 <b>ECAÇGTGEE</b>	NPAS2(bHLH)/Liver-NPAS2-ChIP-Seq(GSE39860)/Homer	le-3	-8.897e+00	0.0079	18.0	26.09%

### **PCN**

RankMotif		N	btu	haa Damahaa	(Paraisaniani	a Tours Comment and Marie	B/ of Towns Common with Month
Canalison		Name	P-varue	iog P-pvaiue	q-value (Denjamini)	= 1 arget Sequences with Atom	% of Targets Sequences with Motif
FIRM CERE		RARa(NR)/K562-RARa-ChIP-Seq(Encode)/Homer	le-11	-2.679e+01	0.0000	59.0	65.56%
· <u>Attgçççaaç</u>		CEBP(bZIP) ThioMac-CEBPb-ChIP-Seq(GSE21512) Homer	16-9	-2.292 <b>e</b> +01	0.0000	23.0	25.56%
P SETGXIGCAA		CEBP:AP1(bZIP)/ThioMac-CEBPb-ChIP-Seq(GSE21512)/Homer	1e-9	-2.085 <b>e</b> +01	0.0000	24.0	26.67%
· <b>CAAACGICA</b> S		Erra(NR)/HepG2-Erra-ChIP-Seq(GSE31477)/Homer	1e-7	-1.653 <b>e</b> +01	0.0000	44.0	48.89%
· ZSAGGICA		THRb(NR) Liver-NR1A2-ChIP-Seq(GSE52613) Homer	le-6	-1.580e+01	0.0000	62.0	68.89%
· FACCATO	ŢÇĄ	PPARa(NR),DR1/Liver-Ppara-ChIP-Seq(GSE47954)/Homer	le-6	-1.479 <b>e</b> +01	0.0001	27.0	30.00%
<sup>,</sup> <b>@TGATGŞAA</b> Z		Atf4(bZIP) MEF-Atf4-ChIP-Seq(GSE35681)/Homer	le-5	-1.373 <b>e</b> +01	0.0002	11.0	12.22%
· SEESSAAGGTC		COUP-TFII(NR) K562-NR2F1-ChIP-Seq(Encode)/Homer	le-5	-1.360e+01	0.0002	32.0	35.56%
· <b>FEEGTSCAAA</b> C	T <b>SCA</b>	HNF4a(NR),DR1/HepG2-HNF4a-ChIP-Seq(GSE25021)/Homer	le-5	-1.360e+01	0.0002	17.0	18.89%
·· TGACCITTERCO	ÇĄ	PPARE(NR),DR1/3T3L1-Pparg-ChIP-Seq(GSE13511)/Homer	le-5	-1.287 <b>e</b> +01	0.0003	24.0	26.67%
" <b>ETTATETAA</b> E		HLF(bZIP) HSC-HLF.Flag-ChIP-Seq(GSE69817)/Homer	1e-5	-1.287 <b>e</b> +01	0.0003	18.0	20.00%
<sup>12</sup> <b>ATTACATCA</b>		Chop(bZIP) MEF-Chop-ChIP-Seq(GSE35681) Homer	1e-5	-1.214e+01	0.0004	9.0	10.00%
IS SEE SEE SEE SEE SEE SEE SEE SEE SEE S		EAR2(NR) K562-NR2F6-ChIP-Seq(Encode)/Homer	1e-5	-1.194e+01	0.0005	29.0	32.22%
<sup>14</sup> TATTIACITA		FOXM1(Forkhead)/MCF7-FOXM1-ChIP-Seq(GSE72977)/Homer	10-4	-1.130e+01	0.0009	21.0	23.33%
<sup>13</sup> <u>GGTCAŞŞTGA</u> GO	<u>IÇA</u>	THRb(NR) HepG2-THRb.Flag-ChIP-Seq(Encode) Homer	10-4	-1.118e+01	0.0009	16.0	17.78%
16 JAGGGCAAAGG	<u>CA</u>	RXR(NR),DR1/3T3L1-RXR-ChIP-Seq(GSE13511)/Homer	le-4	-1.117 <b>s</b> +01	0.0009	25.0	27.78%
17 <b>A<u>aa</u>gtaaaca</b>	ı	FOXA1(Forkhead) MCF7-FOXA1-ChIP-Seq(GSE26831) Homer	le-4	-1.030 <b>e+</b> 01	0.0019	19.0	21.11%
IS SACCICATES	GTIÇA&&	VDR(NR),DR3/GM10855-VDR+vitD-ChIP-Seq(GSE22484)/Homer	le-4	-9.571 <b>s</b> +00	0.0038	9.0	10.00%
₽ <mark>\$<u>\$</u>\$GGTCA</mark>		COUP-TFII(NR)/Artiz-Nr2f2-ChIP-Seq(GSE46497)/Homer	lo-4	-9.334 <b>e</b> +00	0.0045	31.0	34.44%
	ŢģÇ	GRE(NR),IR3/RAW264.7-GRE-ChIP-Seq(Unpublished)/Homer	le-4	-9.239 <b>e</b> +00	0.0047	9.0	10.00%
" JECACGTEAST		bZIP28(bZIP)/col-bZIP28-DAP-Seq(GSE60143)/Homer	le-3	-9.134 <b>c</b> +00	0.0050	8.0	8.89%
		FOXA1(Forkhead)/LNCAP-FOXA1-ChIP-Seq(GSE27824)/Homer	le-3	-9.127e+00	0.0050	21.0	23.33%
BECAAGGICA		Nr5a2(NR) Pancreas-LRH1-ChIP-Seq(GSE34295) Homer	le-3	-8.987 <b>e</b> +00	0.0053	18.0	20.00%
* <mark>\ge_caccaccatce</mark>		USF1(bHLH)/GM12878-Usf1-ChIP-Seq(GSE32465)/Homer	le-3	-8.812 <b>e+</b> 00	0.0061	12.0	13.33%
E CACGTGGC		ABF1(bZIP)/Arabidopsis-ABF1-ChIP-Seq(GSE80564)/Homer	le-3	-8.405 <b>e</b> +00	0.0087	16.0	17.78%
# GGICATCTGACO	<u>&amp;CA</u>	THRa(NR)/C17.2-THRa-ChIP-Seq(GSE38347)/Homer	le-3	-8.405 <b>e</b> +00	0.0087	12.0	13.33%
# BTIACETA LES	C C C C C C C C C C C C C C C C C C C	NFIL3(bZIP) HepG2-NFIL3-ChIP-Seq(Encode) Homer	le-3	-8.362 <b>e</b> +00	0.0087	12.0	13.33%
* EGACACGTEGE		ABF2(bZIP)/col-ABF2-DAP-Seq(GSE60143)/Homer	le-3	-8.359e+00	0.0087	7.0	7.78%
» BECACGTES	<b>4</b>	AREB3(bZIP)/col-AREB3-DAP-Seq(GSE60143)/Homer	1e-3	-8.174e+00	0.0095	8.0	8.89%
	,						

### Supplemental Figure 6. Examples of co-localization between PXR-binding and the epigenetic mark H3K4me2 around IncRNA gene loci

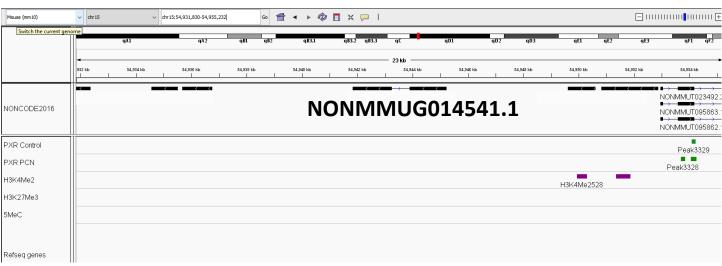
#### A



**Green: PXR-DNA binding peaks;** 

Purple: H3K4me2 peaks

#### В



**Green: PXR-DNA binding peaks;** 

Purple: H3K4me2 peaks

| IncRNA CO\_2 | IncRNA CO\_3 | IncRNA PCN\_1 | IncRNA PCN\_2 | IncRNA PCN\_3 | IncRNA PCN\_2 | IncRNA PCN\_3 | IncRNA PCG F CO\_1 FPKM CO\_1 1.49249 PCG PCG CO\_2 FPKM CO\_3 FPKM
77 28.2182 25.296
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NONMMUG010862.2 Chr13:45410755-4541201	9 2 2 5850	3 68831	2 68309	2 06989	1 84382	2 34077	0.03935	Motion	3'UTR	21645	2 33083	2 6985 2 9914	46l 1.08399	1 99636	1 92431	0.0005
NONMMUG043240.2 chr9:70254150-70256022 NONMMUG031885.2 chr5:21661878-21662606	4.79643 1.71403	3.68831 2.99415 2.83454	2.68309 1.17732 1.47946	2.06989 2.08248 4.99267	1.84382 0.765034 3.34644	2.34077 0.930076 5.09943	0.0005 0.0348	Myo1e Napepid	Intron Downstream	21645 47736 39152	2.33083 8.99006	l- l-	-	1.99636 7.44313	1.92431 5.84036	0.0005
NONMMUG033978.2 chr5:134220258-1342235 NONMMUG014706.2 chr15:66929606-6693110 NONMMUG058936.1 chr14:51905211-5191977	97 1.28454 8 0.235542 9 249.601	2.56333 3.64246 271.711	2.34162 2.60128 182.47	1.61767 2.12895 193.955	1.24358 14.5041 142.346	0.993711 3.75093 156.892	0.0106 0.0161 0.0124	Ncf1 Ndrg1 Ndrg2	Intron 3'UTR Intron	7698 39283 993	1.11358 2.96955 291.394	1.89329 2.302 7.2297 5.084 349.609 300.5	38 1.17992 43 13.6268 59 217.679	1.4036 19.8402 252.181	1.00019 13.4166 199.931	0.00455 0.00005 0.0019
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NONMMUG0157954.2 (chr7.45077329-45078198 NONMMUG010653.2 (chr13:33986501-3398781 NONMMUG010651.2 (chr13:33965326-3396796	4.545 4 3.7584 4 1.0788 80 22.446	6.87979 0.821778	4.71676 0.316737 37.7409	11.2881 15.3402 1.6979 14.8434	11.5897 15.1837 1.59975 13.4175	11.7108 13.215 2.64566	0.02 0.0005 0.0027	Nqo2 Nqo2	Downstream 3'UTR Intron	1335 22498 1986	6.35669 6.35669	10.3866 8.136 10.3866 8.136 10.3866 8.136 7.22934 6.0820	13 6.88597 69 19.4566 69 19.4566	8.54818 20.1787 20.1787	7.04372 22.1426 22.1426 7.537	0.00025 0.00025
NONMMUG041989.2 chrs:128436235-1284885 NONMMUG045105.2 chrs:72894377-72951966	1 50381	1.12561	1.57457			10.6807	0.0017	Nrp1 Nsdhi	Intron	103334 4614	8.96689			8.00605 21.119		0.1778 0.00005
NONMMUG001708.1 chr1:132319400-1323344 NONMMUG043347.2 chr9:74847982-74891475 NONMMUG021209.2 chr19:32666294-3266717	8 16.2395	1.26601 5.68226 5.1.6205	2.07071 6.85202 34.405	1.16558 1.08572 157.641	0.571464 1.57575 102.086	0.799782 1.55071 141.024	0.00075 0.01005 0.00005	Onecut1 Papss2	Upstream Intron 3'UTR	3244 46731	4.87688 3.22742 10.8287	3.09918 5.701 2.06249 4.6119 36.6177 26.47	71 1.87565 95 0.611725 75 73.362	2.11716 1.94456 95.8759	1.76151 0.908683 104.025	0.00005 0.00005 0.00005
NONMMUG021206.1 chr19:32617807-3263774 NOMMMUG01305.2 chr14:56607260-5662065 NOMMMUG003814.1 chr10:63037253-630488 NONMMUG003815.1 chr10:63038099-6306194	6 1.13173	0.838975 3.50765 2.42027	0.972747	1.91139	2.48906 1.47871 0.614675	5.41075 1.7367 0.509062	0.0012 0.01745 0.0006 0.00115		Intron Intron	7771 38337 18309	10.8287	36.6177 26.477	75 73.362	95.8759	104.025	0.00005
NONMMUG003815.1 chr10:63058099-6306194 NONMMUG005541.1 chr11:23652638-2365469	9 2.551 8 4.1925 3 0.263284	4.64753 0.851285	3.20479 0.811409 3.28628 0.68187	1.44121 1.65869 3.71723 2.45698	2.10528 1.28249	1.55407 0.901043	0.00115		Upstream Intron	-1559 12294	19.735 19.735 4.73593	20.6534 19.93 20.6534 19.93 5.72701 6.14	31 13.7448 31 13.7448 53 7.29856	12.8249 12.8249 9.67344	8.81929 8.81929 8.94445	0.0005 0.0005 0.1606 0.7502
NONMMUG006050.2 chr11:51596594-5159941 NONMMUG027241.2 chr3:94958620-94981867 NONMMUG038664.2 chr7:90207694-90208833	5 0.612876 0.843901 9.78291 2.7724	0.808563 1.84419 15.8924	1.00417 0.853388 16.9068	2.17906 2.17122 58.2907		2.10497 3.34172 55.6786	0.0085 0.0413 0.00005		Upstream Upstream 3'UTR	-1263 -4488 78031	4.97494 5.86634 5.10191			3.57461 5.70857 36.8567	3.135 6.72674 32.2277 24.6342	0.7502 0.545 0.00005
NONMMUG001169.2 chr1:84259915-84262226 NONMMUG053244.1 chr11:75599645-7560023		2.719	2.96111 102.063	2.07953	3.61023 50.4421 1.74803 137.89	1.73053 83.6194	0.0111	Pid1 Pitpna	Intron	23575 11779	15.8408	19.9319 39.95 9.72936 10.06	16 21.5622	26.8627 11.6681	24.6342 11.0038	0.1679 0.918
NONMMUG039125.2 chr7:116281511-1162828 NONMMUG031184.2 chr4:141625734-1416263	90 0.458181 54 5.1973	0.343365	0.213379 4.49606	3.78175 3.0987	0.98219 2.84816	1.75555 2.32542	0.0313	Plekha7 Plekhm2	Intron 3'UTR	26041 38074	1.26679	1.33224 1.9745	52 1.03973	1.99579	1.35173	0.1592
NONMMUG030141.2 chr4:108084381-1080871 NONMMUG034514.1 chr6:5166257-5170486 NONMMUG034010.1 chr5:135727097-1357347	20 1.70865	0.763881 7 45.5612 6 0.243229	1.34986 26.0686 4.58664	1,98584 30,5552 7,70824	2.96594 15.3229 51.7376	1.2325 25.8117 5.36541	0.00905 0.0075 0.00005	Por	Intron Exon/CD Upstream			0.545036 0.46370 309.176 220.43 45.3194 63.855		3.34456 174.331 418.472	2 22991 233.864 320.26	0.00005 0.00735 0.00005
NONMMUG034025.2 chr5:135709749-1357132 NONMMUG034024.2 chr5:135698162-1356990 NONMMUG040322.2 chr8:35385811-35388130	11 2.8010: 19 0.22774: 26.099:	2.51652 0.350815 44.9943	1.90305 0.862213 13.9043	12.3889 0.889235 29.179	10.4985 2.62335 15.5553	15.0401 4.21252 18.4503	0.00005	Por	Intron Intron 3'UTR	22322 9432 11229	87.6467 87.6467 20.319	45.3194 63.855 45.3194 63.855 36.2656 13.177	56 261.871 56 261.871 77 19.9278	418.472 418.472 14.9202	320.26 320.26 15.8639	0.00005 0.00005 0.00155
NONMMUG021490.1 chr19:46063458-4606631 NONMMUG031229.2 chr4:143107392-1431087 NONMMUG019790.2 chr18:41875602-4187562		0.638335 3.06457	2.90664 3.09955	0.405123 2.29719 13.1498	1.30775 1.79187 16.8856	0.760665 2.31533 5.97344	0.02855 0.0014 0.0002	Pprc1 Prdm2	STUTR STUTR	805 104617 75483	1.073/	0.993175 3.432 2.51826 3.269 0.0730819 0.600	0.663161	1.47141 2.79244 8.54821	1.01551 2.15669 14.3011	0.0001 0.0008 0.0008
NONMMUG030059.2 chr4:105029165-1050311 NONMMUG030060.2 chr4:105033610.1050356	87 2.54703 57 0.629333	0 0 2.81143 2.00999	2.1021 3.73137	13.1498 6.70898 1.4878	16.8856 6.17851 8.04569	5.97344 5.63234 5.4933	0.0002 0.0016 0.01095	Pykaa2	3'UTR 3'UTR 3'UTR	79714	0.930118 0.930118	1.92222 2.059:	52 2.78625	8.54821 6.11863 6.11863	14.3011 4.36487 4.36487	0.00005 0.00005 0.00005
NONMMUG027362.2 chr3.97653067-97653710 NONMMUG014054.1 chr15:10263115-1026676 NONMMUG021879.2 chr2.6108827-6110513	18.412	19.122	22.6632 2.71314	79.4481	99.5395 0.887613	99.8025	0.00005	Prkab2 Prir	Upstream	-4805 15380	10 7051			12.41		
NONMMUG021879.2 chr2-6108827-6110513 NONMMUG022002.1 chr2-12923513-12925219 NONMMUG027430.2 chr3-101040235-1010412	5.6252	2.6946 4.29511 1.03021	1.04142 3.12927 0.817413	1.39548 4.21319 1.21719	0.454692 1.65277 2.30996	1.22989 1.67828 1.94495	0.0029 0.00235 0.03175	Pter	Intron Intron 3'UTR	20541 265 69533	5.0251 7.2886			3.99113 11.5938	24.7084 3.19139 9.2536	0.6752 0.0438 0.87085
NONMMUG009717.2 chr12:98688257-9868960 NONMMUG042892.2 chr9:57044199-57071967	9 0.283746 1.92345	0.664585 1.66465	1.01488 2.07086	0.518504 1.05013 3.67838	3.15004 1.27221	2.01684 0.867302	0.0087 0.02475	Ptpn21 Ptpn9	Exon/CD Intron	45712 63115	1.1541 2.34585	1.42303 1.4744 3.01738 4.018i 15.6034 12.264	42 2.24876 81 4.29563	2.88008 5.47446	3.61123 6.11871 7.85044	0.00085 0.0261 0.00115
NONMMUG037362.1 chr7:19723440-19725521 NONMMUG004070.2 chr10:78170024-7817291	0 1.4676	1.40588	3.0445 1.33253 2.18377		2.6992 0.989604 1.53071	2.68637 0.795554	0.0114	Puri2	Intron 3'UTR	25093 13682				12.4403 1.61836		0.01115
NONMMUG036687.1 chr6:128524201-1285267 NONMMUG005420.2 chr1::20216483-2021729 NONMMUG025735.2 chr2:173701564-1737021 NONMMUG03108.2 chr4:37616978-1377066	9 1.94743	2.07066 4.55111 7.34998	2.47338 9.91189	4.13463 10.8471 8.65906 1.87003	5.3106 6.78157 2.16495	1.46353 4.62081 6.08977 2.59748	0.0225	Kab22a	Intron Intron Downstream	1221 15282 42016 14374	443.947 14.4468 5.56114	492.725 734.8 22.0189 28.64 3.80528 6.958 0.633889 0.1733	39 203.175 42 31.0873 73 4.55012 78 2.01696	352.571 29.8253 6.05735 2.61776	287.431 27.7433 4.63267 2.93609	0.0005 0.40905 0.1044 0.00005
NONMMUG012260.2 chr14:16430655-1643263	8 0.274043	0 0.496805 7 17.1076	0.59127 14.9838	3.09116		2.59748 3.88076 24.9966	0.00005	Rarb	Intron 3'UTR	143826	0.428527	0.496312 0.50703	3 7410	2.61776 4.37324 57.4008		0.00005
NONMMUG004277.2 chr10:85015041-8501833 NONMMUG021794.2 chr2:3327307-3328870	7 1.20915	1.44392 2.82431	14.9838 1.20094 1.62646	1.20258 8.85853	26.379 0.606373 5.03898	0.853217 8.64591	0.04365 0.02135 0.00005	Rpp38	Downstream Downstream	10011 99033 4555	1.7672:	38 1935 32.136 1.46854 1.3803 1.43915 1.818	57 2.60756	0.793878 1.50797	55.5239 0.999602 1.59592	0.0172 0.0065 0.8183
NONMMUG020594.1 chr19:4162259-4163354 NONMMUG010732.2 chr13:37836931-3783963 NONMMUG044032.2 chr9:110986200-1109878		3.28841 1.06003 12.1473	0.506173 1.6513 16.1351	0.201021 1.10575 4.39037	0.525883 0.593687 9.38039	0.74158 2.06049 6.29944	0.0388 0.0217 0.00115	Ros6kb2	Intron Intron Exon/CD	494 10892 2711	5.90524 2.37353 28.079	3.87219 4.0909	92 5.38683	6.73822 4.3867 11.4244	4.68997 2.72024 8.37255	0.7628 0.7638 0.00005
NONMMUG007634.2 chr11:101431109-101437 NONMMUG027719.1 chr3:115710402.1157270	349 1.41604	1.29074	1.7208 6.40137	0.794999 6.80714	1.74611	1.19494 1.52147	0.0138	Rundc1 S1pr1	Exon/CD Upstream	9144 -3644	20.0706	2.38891 3.0158	89 1.42523 32 15.045	1.91274 10.9573	11.8382	0.0039
NONMMUG037820.1 chr7:46751672-46755671 NONMMUG037818.1 chr7:46704887-46732786 NONMMUG006205.2 chr11:57795495-5780147	329.261 51.7024 0 6.65961 6 183.83	7.06081 18.7651 5.14353	219.321 103.57 2.29564	111.708 11.7518 2.05907 107.113	48.9954 12.6769 1.4752 137.873	52.5099 11.1829 0.989102	0.0002 0.0005 0.00436	San2 San3 Sap301	Intron Upstream Upstream	1838 -3160 -3155	6736.04 25.0666 4.42635 127.733	164.397 6447.6 27.0784 293.0 3.64914 5.548 498.269 324.0	69 1899.63 51 13.3816 51 6.01355	1020.04 8.08449 4.23646	1328.38 7.27573 3.74023	0.00005 0.00005 0.3658
NONMMUG021443.2 chr19:44394453-4439761 NONMMUG005046.1 chr10:127908021-127910			2.29564 359.404 3.03527			51.9616 0.979827	0.00005	Scd1 Sdr9c7	3'UTR Intron	5817				128.842 4.90344	3.74023 43.5575 3.23759	0.00005 0.00005
NONMMUG013936.1 chr15:3275354-3277427 NONMMUG024426.1 chr2:121447112-1214519 NONMMUG011593.2 chr13:92709232-9271194	2.71155 54 2.42478 3 3.45185	3.20795 2.91754 4.77213	2.47606 2.88919 5.80057	0.553017 0.836456 9.23105	1.44071 1.79866 11.2806	1.68098 1.3958 14.0812	0.00065 0.0078 0.0006	Sepp1 Serf2 Serinc5	Intron Intron 3'UTR	4305 121 99449	1405.03 14.4568 2.47508	2325.7 2102.3 12.9423 16.36 3.68942 4.8938	36 1199.04 74 13.0203 86 5.73685	1695.17 16.8199 10.7791	1043.47 9.17294 10.6072	0.00615 0.0049 0.00005
NONMMUG002213.2 chr1:161001008-1610018 NONMMUG006752.1 chr11:75414532-7541817			2.44644 3.79332	5 24271	6.54238 3.57276 14.1847 64.27	3.79456 2.32673	0.00305 0.00015	Serpinc1 Serpinf1	Intron Exon/CD	12049	9263	931 806 874 69	92 689 234	835.939 209.454	10.6072 688.523 125.166	0.032 0.00005
NONMMUG033800.2 (hrs:124460758-1244627 NONMMUG033749.2 (hrs:10:6109650-6110100 NONMMUG039307.2 (hr7:126472074-1264871	73 5.3733 8 13.897 75 1.0203i	5.0768 4.82987 12.8976 1.13741	9.51075 2.23913	3.19905 17.1365 51.2281 0.671403	14.1847 64.27 1.21972	13.6355 59.9529 1.15695	0.00005 0.00005 0.04075	Sgpl1	3'UTR	10344 47815 -4494	4.0446 12.3177 4.47955	377.483 312.1 4.83999 4.1622 11.7752 9.398 3.68376 5.068	27 13.9815 84 43.6644 52 2.70463	15.3697 67.3453 3.62073	125.166 13.3563 64.5142 3.18732	0.00005 0.00005 0.0015
NONMMUG021548.2 chr11:47265024-4726533 NONMMUG031545.1 chr7:144326502-1443276 NONMMUG0305106.1 chr7:143265000.5346100	9 0.461280 86 1.58407 7 0.0000	2.27158 0.58911	2.77638 0.0451304	4.87008	1.21972 7.30034 0.594493	7.48301 1.6417 5.01944	0.0369	Sh3pxd2a Shank2	Upstream 3'uTR Intron	199230 42700	0.854274	1.17557 1.5944	48 1.12726	2.75815	1.88283	0.1207
NONMMUG039503.1 chr7:140863341-1408646 NONMMUG040073.2 chr8:22480290-22483331	50 7.79093	2.28659 5.88233 0.931545	1.44458 3.93778 0.316375	10.6821 5.73003 3.43645	4.25769 3.6271 2.246	3.25009 2.91152	0.0232	Shroom1 Sirt3 SSr20a2	Intron 3'UTR Intron	3224 17874 5110	23.1638	10 2266 9 903		13.6278 17.0613 20.4966	10.1776 12.9052 13.9378	0.0078 0.00845 0.092
NONMMUG017484.1 chr17:12659709-1267244 NONMMUG024756.1 chr2:132065740-1320678	3 1.43345 76 0.226934	1.26102 0.815717	1.34522 0.344759	6.12425 2.58917	1.73935 2.127 4.94737	1.89161 2.67017	0.0385 0.00005	Slc22a1 Slc23a2	Intron Exon/CD	9762 232	146.859 0.21173	125.455 135.30 0.912862 1.0831	08 214.83 96 3.16843	233.917 8.15657	199.881 7.12627	0.1297 0.00005
NONMMUG039639.2 chr7:141429751-1414353 NONMMUG078162.1 chr7:12996123-12997629 NONMMUG002731.2 chr1:185466910-1854687	41 10.6128 21.6925 59 3.88543	9.90621 25.8516 7.58961	12.163 13.4594 6.73652	4.73851 10.3934 4.49983	11.3558 4.05129	3.83989 9.41545 2.12191	0.00005 0.01155 0.00155	Slc25a22 Slc27a5 Slc30a10	Intron Intron 3'UTR	302 1274 12986	265.645 3 37155	26.2429 36.31 313.099 275.21 6.29821 6.2281	91 111.489 11 3.12163	145.651 145.651 4.16034	95.618 2 33423	0.00005 0.00005 0.00005
NONMMUG040930.2 chr8:72477997-72481809 NONMMUG043919.1 chr9:107647524-1076522 NONMMUG004239.2 chr10:83230848-8323371	3.48274 42 300 353	3.84145 243.282 5.24064	6.05758 254.471	2.86234 158.843 7.19457	2.75421 130.699 5.90921	2.60232 116.941	0.0021	Sk35e1 Sk38a3	Downstream Downstream 3'UTR	12711 9645	5.41421 290.161	5.55364 9.2206 263.083 359.56 3.378 15.23	61 3.12571 62 143.959	5.42661 200.305	4.29577 146.034 6.61895	0.00005 0.00005 0.001
			20.2865 0 1.60493			10.117 2.45693 1.59621	0.01695 0.0423 0.03585	Sico1a1	Intron Intron	105600 31626 80834				4.662 2.16825 22.1448		0.00005
NONMMUG043803.2 chr9.103088218-1030904 NONMMUG021075.2 chr19.26732331-2673343 NONMMUG005048.2 chr10:128489199-128490	587 12.702.	1.64117 0.980605 13.2168	1.60493 1.48675 11.1167	1.87139 4.10516 11.4297	1.47603 1.58484 8.30763	1.59621 2.46037 9.10389	0.02815		Intron 3'UTR	10934 30657	24.3185 8.96803 8.69645	10.2796 12.458	6.3284	22.1448 11.5501 10.7702	15.4088 13.3983 8.7682	0.001 0.1228 0.0094
NONMMUG006311.2 chr11:60787252-6078828 NONMMUG012551.2 chr14:31128641-3112890 NONMMUG021326.1 chr19:40293989-4029546	5 44.2074	4.48242 22.0425 1.92923	6.11246 27.4703 1.61578	2.40192 17.9402 2.96301	2.881 11.311 4.1141	3.18298 15.8417 3.64163	0.01145 0.0057 0.03905	Smim4	3'UTR Exon/CD Downstream	10243 120 107539	2.21803 17.5048 2.94181 0.782661	2.92304 5.028 15.388 14.16 4.32773 3.536 1.015 1.788	07 1.40139 36 7.59216 39 4.20459	2.63101 7.62624 7.21551	2.45586 8.13183 5.51898	0.00075 0.11755 0.1442
NONMMUG011326.1 chr19:4029389-4029546 NONMMUG015439.2 chr15:992131075-9921321 NONMMUG099013.2 chr12:54645404-5464613 NONMMUG0290153.1 chr2:181203452-1812296	2 9.3318	1.92923 1.75557 18.3882 7 5.60877	1.61578 2.1817 12.4409 4.54369	2.96301 5.81903 35.4242 4.89629	4.1141 3.51204 18.8494 3.85663	3.64163 3.94764 21.2846 3.63175	0.03905 0.03735 0.04505 0.04415	Sptssa	Downstream Exon/CD 3'UTR	107539 85566 10804 -3390	0.782661 6.26685	1.015 1.7884 12.3292 8.691	39 4.20455 45 2.40381 18 19.797	7.21551 3.29973 14.3284	5.51898 2.65273 13.4496	0.1442 0.0025 0.02805
NONMMUG042451.2 chr9:35218538-35220354 NONMMUG026762.2 chr3:65379663-65381765	0.393553 58.7083	0.643376 63.9314	1.34884 58.5896	2.69371 137.38	1.31955 143.466 5.44638	1.75631 153.596	0.02455	Srpr Ser3	Upstream Intron 3'UTR	-3390 4547 11909	75.0947 47.7458	55.4219 74.51 55.2774 53.792 16.4263 26.481	85 68.4792 21 111.726 89 12.7405	88.7458 134.105 18.7419	79.6792 137.19 9.45418	0.66805 0.00005
NONMMUG030411.2 Chi4:117975035-1179939 NONMMUG037277.2 chi-7:14410689.14411717	73 86 376	90.9624	65.0483	4.46756 6.53691		5.30811 3.62173	0.00005	St3gal3 Gult2a8	Intron 3'UTR	15U586 27348	32.7848	16.4263 26.489		7.71236		0.0001
NONMMUG002685.2 chr1:182892229-1828965 NONMMUG004627.2 chr10:108497653-108499 NONMMUG040125.2 chr8:25199493-25200543	80 11.4348 386 1.4051 3.4363:	9.77981 3.21493 2.12605	13.1757 2.01866 1.49546	0.717017 6.03213 2.00782	0.908127 7.60699 1.72517	0.31992 6.39176 0.22907	0.00005 0.0001 0.0212		Intron 3'UTR Intron	129509 512456 1431	8.11000 0.852127 3.98726	4.34203 4.6994	46 3.58125	1.31333 4.84286 3.90925	0.211495 3.76938 3.57894	0.00005 0.00005 0.0215
NONMMUG039442.2 chr7:130686262-1306883 NONMMUG007822.2 chr11:106065076-106066 NONMMUG033565.2 chr5:117130322.1171332	45 2.12647 844 2.15998 48 2.2015	1.57501 1.17814 1.01999	1.60459 0.854896 0.503109	1.23215 0.888634 1.38448	1.16903 0.750544 0.495106	1.34176 0.59634 0.657046	0.04745 0.0217 0.0106	Tacc2 Tacc1	Intron Upstream	109819 -101 5484	4.81136 4.31684 3.95089	2.91331 15.881 5.17254 4.7064 4.52992 5.7961	19 2.89025 41 3.16883 77 4.88702	5.44189 6.43843 6.88849	3.17354 4.16473 5.00435	0.00005 0.1737 0.7728
NONMMUG033565.2 chr5:117130322-1171332 NONMMUG031377.1 chr4:148614936-1486160 NONMMUG041581.2 chr8:109986051-1099867	56 5.25378	1.01999 6.09007	0.503109 3.63558 57.4704	2.61678 0	0.495106 1.51128 0	2.44906	0.0001 0.00005	Tat	Intron 3'UTR Upstream	11499 -4034	3.95085 2.10418 407.448	4.52992 5.7961 2.9053 2.2145 304.626 320.4	53 3.01164 44 179.568	6.88849 2.54137 139.103	5.00435 2.31631 186.804	0.7728 0.83335 0.00005
NONMMUG008249.2 chr11:119143047-119145 NONMMUG043565.2 chr9:90202062-90204162 NONMMUG042565.2 chr9:42412343-42415513		2.57744 4.48011 7.92522	1.27423 4.86297 5.79276	1.34289 4.03395 23.3778	1.17531 2.69074 21.9912	0.63248 3.62097 23.9261			3'UTR 3'UTR 3'UTR	84003 67657 43671	2.78213			2.62518 11.7447	2.4498 12.4954	0.0068S 0.0000S
NONMMUG034071.1 chr5:137581517-1375849 NONMMUG035617.1 chr6:71129374-71139723	40 3.0613	0.712923	3.00347 0.400472	0.988243 2.17093	1.37357 2.70179	1.02446 2.22139	0.0002	Tfr2 Thest2	Upstream	-57	78.8914 13.3325	60.257 75.835	54 28.0447	41.2211 42.6954	26.6743 35.6929	0.00005 0.00005
NONMMUG012592.2 chr14:32199345-3220048 NONMMUG042448.2 chr9:35184396-35186910 NONMMUG015445.2 chr15:99408651-9941004	5.64363 8 509.072	1.37504 4.24557 461.134	0.267592 5.23406 393.052	2.43365 3.88251 401.156	1.16125 2.23764 351.549	1.68717 3.57687 282.937	0.0387 0.00325 0.0353		Intron 3'UTR Downstream	1953 14638 3475	32.9253 4.67706 379.905	36.0672 39.48 4.04832 6.153 375.373 338.42	76 46.3159 06 3.75464 27 288.763	46.2225 3.00628 307.012	32.9856 2.74719 237.425	0.5499 0.0001 0.0065
NONMMUG020835.2 chr19:10870663-1087107 NONMMUG057753.1 chr14:30875551-3087575	4 5.38487 7 0	4.31755 0 0 2.07039	3.37449 0 2.67692	11.2572 0 0.780206	9.2906 18.818	11.6799 9.13175	0.0397	Tmem110	3'UTR Downstream	11133 3299 10118	7.4035 2.11956	6.61019 5.1384	45 9.30572	11.8509 1.87925	11.3579 1.29426	0.05945 0.223
NONMMUG020834.2 chr19:10859137-1086050 NONMMUG025570.2 chr2:167642617-16764323 NONMMUG034860.2 chr6:30481235-30482339	8 1.0916 01 6.8873 1.3670	2.49241	2.67692	1.20393	1.39983 2.17562 2.53006	0.83061 1.01763	0.00195 0.0019 0.0269	Tmem189	Intron 3'UTR Intron	10118 18647 27917	4.91662	4.35983 5.0949	99 1.43439 51 2.6959	2.48328 4.36795	2.04405 4.44642 11.8323	0.00005 0.00025
NONMMUG027780.2 chr3:121202012-1212037 NONMMUG031183.2 chr4:141613858-1416160 NONMMUG004390.2 chr10:91160418-9116163			0.858831	2 66931	2 53006		0.00235					1 38298 1 0374	28 10 2781	16.7277		0.00005
NONMMUG004390.2 chr10:91160418-9116163 NONMMUG014914.2 chr15:78438745-7843930 NONMMUG031626.2 chr4:156010943-1560136 NONMMUG002117.2 chr1:156004613-1560071		1.02098 8.61849 0.507915	0.858831 5.05405 0.674374	2.66931 15.1052 2.58452	11.6562	2.45491 10.1717 0.955618	0.0334	Tmem82	Intron	80231	1.99427 2.89779 3.42888	7.44299 6.1652	09 5.38534	6.24819	11.8323 4.47159	0.36615
	1 0.572361	8.61849 0.507915 1.93105 0.967109	5.05405 0.674374 1.21455 2.20221	15.1052 2.58452 4.90955 3.30871	11.6562 1.19293 3.12617 4.08879	10.1717 0.955618 5.09489 2.74467	0.0334 0.00255 0.03365	Tmem82 Tmpo Tmprss6	Intron Intron Downstream	80231 3704 10556 29611	2.89775 3.42888 3.00552 56.2122	7.44299 6.1652 3.42386 4.4056 3.40206 3.454 62.537 78.974	5.38534 49 8.26224 43 23.6565	6.24819 10.6099 48.3704	4.47159 10.1413 21.7379	0.36615 0.00005 0.00005
NONMMUG010890.2 chr13:47023625-4702728	1 0.572361 14 3.31111 03 6.06512 6 5.79661	8.61849 0.507915 1.93105 8 0.967109 1 3.67985 6.64532 7.80699	5.05405 0.674374 1.21455 2.20221 3.87776	15.1052 2.58452 4.90955 3.30871 2.66351 4.79116	11.6562 1.19293 3.12617 4.08879 2.36743 6.83007	10.1717 0.955618 5.09489	0.0334 0.00255 0.0365 0.0365 0.0303	Tmem82 Tmpo Tmprss6 Tnfrsf4 B Tor1aip1	Intron	80231 3704 10556 29611 -1565 28959 17755	2.89779 3.42888 3.00552 56.2122 5.73106 6.70014	7,44299 6.1652 3,42386 4.4050 3,40206 3,454 62,537 78,974	09 5.38534 49 8.26224 43 23.6565 50 5.28121	6.24819 10.6099 48.3704 8.22745	4.47159 10.1413 21.7379	0.00005
NONMMUG010890.2 chr13:47023625-4702728 NONMMUG042619.2 chr9:4466998-446723818 NONMMUG029161.1 chr4:4652398-465294177 NONMMUG006241.2 chr11:58965747-5897805	1 0.572361 14 3.3111: 03 6.06512 6 5.79663 5.6247; 0.79603: 1 0.0486115	8.61849 0.507915 1.93105 8 0.967109 3.67985 6.64532 7.80699 4.02569 1.10759	5.05405 0.674374 1.21455 2.20221 3.87776 8.21728 5.0214 2.56195 0.823711 0.432938	15.1052 2.58452 4.9055 3.30871 2.66351 4.79116 19.0009 8.31489 2.83775 5.42415	11.5562 1.19293 3.12617 4.08879 2.36743 6.53307 16.2589 7.08499 1.21482	10.717 0.955618 5.09489 2.74467 2.09138 4.9889 13.4351 8.42783 1.71657	0.03345 0.00255 0.03365 0.00545 0.00015 0.00015 0.00435 0.02505	Tmem82 5 Tmpo Tmprss6 5 Tnfrsf4 Tortaip1 5 Tpmt 5 Treh 5 Trim14	Intron Intron Downstream Upstream 3*UTR	80231 3704 10556 29611 -1565 28959	2.89775 3.42888 3.00552 56.2122 5.73106 6.70014 1.94106 10.3435	7.44299 6.165; 3.42386 4.4059; 3.40206 3.455- 62.537 78.974- 6.59573 8.806; 9.19422 6.641; 1.03366 0.78944; 12.2959 8.098;	09 5.38534 49 8.26224 43 23.6565 - 59 5.28127 26 23.0398 52 1.11965 78 14.1395	6.24819 10.6099 48.3704 8.22745 21.014 1.64147 19.6452	4.47159 10.1413 21.7379 - 6.00418 20.9004 1.53305 16.516	0.00005
NONMMUG010890 2 chr13.47023625-47022782 NONMMUG042619 2 chr9.44669698-44672381 NONMMUG009161.1 chr4.46523938-46529417 NONMMUG006241 2 chr11.58965747-5897805 NONMMUG005958 2 chr11.48843647-4885349 NONMMUG043124 2 chr9.56330076-65335177	1 0.57/2561 14 3.3111: 03 6.0551; 6 5.79661 5.6247; 0.79603: 1 0.048611: 3 0.73428; 1.01167	8.61849 0.507915 1.93105 0.967109 3.67985 6.64532 7.80699 4.02569 1.10759 1.5034 1.25314 1.79621	5.05405 0.674374 1.21455 2.20221 3.87776 8.21728 5.0214 2.56195 0.823711 0.43293 0.38009 1.74405	15.1052 2.58452 4.90955 3.30871 2.66351 4.79316 19.0009 8.31489 2.23775 5.42415 2.2527 4.0340	11.5562 1.19293 3.12617 4.08879 2.36743 6.83007 16.2589 7.08499 1.11482 1.84434 2.58812 2.19797	10.717 0.955618 5.09459 2.74467 2.09138 4.9889 13.4351 8.42783 1.71657 1.2206 1.677872 3.55082	0.0334 0.0255 0.03365 0.0305 0.0305 0.04435 0.04435 0.0356 0.0366 0.0368	Tmem82 Tmpo Stmpros6 Tnfrsf4 Torsiajp1 Tpmt Treh Strim14 Trim17 Strim2 Trip4	Intron Jones Intro Jones Intr	80331 3704 10556 29511 1-1555 28959 17755 -2194 9433 8007 668 75738	2.89775 3.42888 3.00552 56.2122 5.73106 6.70014 1.94106 10.3435 1.33348 1.57568	7.4299 6.1653 3.42366 4.4050 5.42006 3.4550 62.537 78.974 6.59573 8.8063 9.19422 6.6411 1.03366 0.78943 12.2599 8.0983 - 1.64845 0.44993 2.58336 2.625	09 5.38534 49 8.26224 3 23.6565 59 5.28127 59 5.28127 50 14.1395 52 3.88586 52 3.88586 52 3.88586	6.24819 10.6099 48.3704 8.27745 21.014 1.64147 19.6452 3.71756 4.53651	4.47159 10.1413 21.7379 - 6.00418 20.9004 1.53305 16.516 - 2.43001 4.12973	0.0005 0.3747 0.00005 0.5961 0.0829 0.005
NOMMMUG016890 2 chr13-47023605-4702728 NOMMMUG024519 2 chr4-4666968-4467238 NOMMMUG023915 1 chr4-46523958-46239417 NOMMMUG023614 2 chr15-866747-5897605 NOMMMUG05958 2 chr11-86843647-8865340 NOMMMUG04900 2 chr16-66330076-6635377 NOMMMUG04900 2 chr4-8632096-6335377 NOMMMUG059501 2 chr4-85220681-8222064 NOMMMUG059501 4 chr4-85220681-8222064 NOMMMUG059501 4 chr4-85220681-8222064	1 0.5/258 14 3.3111 03 6.0551 6 5.7966 5.6247 0.79603: 1 0.048611 3 0.73428 1.0116 18 27.702 0.67358 6 1.5231	8.61849 0.507915 1.93105 8.0967109 3.67965 6.64532 7.80699 4.02569 1.10759 1.5028 1.25314 7.19621 6.24459 1.4429 1.4429 1.4429 1.4429 1.4429 1.4429	5.05405 0.674374 1.21455 2.20221 3.87776 8.21728 5.0214 2.56195 0.823711 0.432393 0.38009 1.74405 8.44424 2.00986 1.88681	15,1052 2,28452 4,9055, 3,30871 2,66351 4,79116, 19,0000 8,3,1489 2,83775 5,2415 2,2527 4,03405 9,50973 1,33514	11.6562 1.19293 3.12617 4.06879 2.36743 6.83007 56.2589 7.06499 1.21482 2.184434 2.58612 2.19797 4.558	10.1717 0.955618 5.09489 2.74467 2.09138 4.9889 13.4351 8.42783 1.71657 1.2206 1.67872 3.5002 5.91561 10.9546 1.00117	0.0334 0.0255 0.0355 0.0355 0.0055 0.00545 0.00545 0.0016 0.0015 0.04435 0.0350 0.0350 0.0055 0.0050 0.00050 0.00050	Tmem82	metron  ferron  Connectivam  Co	80231 3704 10556 298611 -15655 28969 17755 -2715 -666 75718 12907 10003 43231	2.89775 3.4288 3.00552 5.73106 6.70014 1.94106 10.3435 1.33346 2.5341 0.609372 3.33341	7.4299 6.1652 3.42386 4.4050 3.40206 3.454 62.537 78.97- 6.59573 8.8061 1.03365 0.789445 1.2559 8.0460 1.2559 8.0460 2.58336 2.6252 2.18675 9.03444 1.05774 1.2574 1.3674	09 5.38534 49 8.26224 43 23.6565 59 5.28121 26 23.0398 52 1.1196 73 14.1397 52 3.88538 52 7.30591 94 4.0901 99 28.3801	6.24819 10.6099 48.3704 8.22745 21.014 1.64147 19.6452 3.71756 4.53651 5.55622 7.88255 38.4116	4.47159 10.1413 21.7379 - 6.00418 20.9004 1.53305 16.516 - 2.43001 4.12973 5.03793 7.47617 23.4092	0.0005 0.3747 0.0005 0.3961 0.0029 0.005 0.01055 0.0005 0.0005
NONIMMUG010890 2 chr13/7023625-7402235 NONIMMUG024519 2 chr24-466998-464672381 NONIMMUG0291611 chr4-4652993-46529417 NONIMMUG0039161 chr158965747-5993-46529417 NONIMMUG0039182 chr11/8894847-88853407 NONIMMUG0039182 chr24-86538076-5895361 NONIMMUG039102 chr24-86538076-5895361-465306 NONIMMUG0399102 chr24-8320461-83220461-83220461	1 0.5/256 14 3.3111 03 6.05611 6 5.0661 5 5.6247 0.79603 1 0.048611 3 0.73428 1 1.0116 18 27.702 0.67388 6 1.5331 54 0.718353	8.61849 0.507915 1.93105 8.0967109 3.67965 6.64532 7.80699 4.02569 1.10759 1.5028 1.25314 7.19621 6.24459 1.4429 1.4429 1.4429 1.4429 1.4429 1.4429	5.05405 0.674374 1.21455 2.20221 3.87776 8.21728 5.0214 2.56195 0.823711 0.432938 0.38009 1.74405 8.44424 2.00986 1.88681 0.293321 0.09351 0.09351	15.1052 2.28452 4.90955 3.30871 2.66351 4.79116 19.0009 8.31489 2.83775 5.4415 2.25227 4.03495 9.50973 1.33614 2.96265 15.3051	11.6562 1.19293 3.12617 4.06879 2.36743 6.83007 16.2589 7.06490 1.21482 1.38413 2.58812 2.19797 4.58 7.9757 1.78179 2.157957	10.177 0.955c18 5.04688 2.74467 2.09188 4.9689 13.4551 8.42788 1.71657 1.2266 1.67872 3.56602 5.91561 10.8346 1.0317 2.42785 2.00999	0.0334 0.00255 0.03155 0.03165 0.00010	Tmem82	metron  ferron  Connectivam  Co	80331 3704 10556 29511 14555 28959 17755 -2194 9433 8097 668 75718 2591 103003	2.89775 3.42888 3.00552 56.2122 5.73106 6.70014 1.94106 10.3435 1.33348 1.57562 22.5341	7.4299 6.165; 3 3.42386 4.4050 3.40206 3.4554 62.537 78.97- 6.50731 8.8056 9.19422 6.641; 1.03366 0.789445 1.2.2559 8.098; 1.58386 0.4699; 2.58336 2.62; 2.18675 9.09446 1.05774 1.8700 3.0303 3.04213 1.05774 1.8700 2.21579 1.987; 3.3382 8.177*	090 5.38334 440 8.26254 431 22.6565 599 5.28121 599 5.28121 599 5.28121 590 5.28121 591 5.28121 592 2.48596 592 3.88388 592 7.30599 591 5.8121 591 591 591 591 591 591 591 591 591 591	6.24819 10.6099 48.3704 8.22745 21.014 1.64147 19.6452 3.71756 4.53651 5.55622 7.88255 38.4116 8.0432	4.47159 10.1413 21.7379 - 6.00418 20.9004 1.53305 16.516 - 2.43001 4.12973 5.03793 7.47617 23.4092 10.7429 10.7429	0.0005 0.3747 0.0005 0.5961 0.0629 0.005 0.01055 0.00005
NONMAMUGO1090.2 (#13.47023625-400723656) NONMAMUGO1091.2 (#13.47023625-40072366) NONMAMUGO1091.5 (#13.4702366) NONMAMUGO1091.5 (#13.4702366) NONMAMUGO1091.5 (#13.4702366) NONMAMUGO1091.2	1 0.5/2581 14 3.3111 03 6.0851 6 5.79665 6 5.5247, 0.79603 1 0.048611 3 0.73428 1 10116 18 27.7020 6 1.5331 54 0.73838 8 3.5714 75 7.0843	1 8.61849 1 0.507913 1 0.507913 3.67985 6.64532 7.80699 1 1.0759 1 1.0759 1 1.25314 1 1.9623 6 24.459 6 4.9862 4.9862 4.9862 6.5478 0 3.19866 3.21134 6.5478	5.05405 0.67437 1.21455 2.20221 3.87776 8.21772 5.0214 2.56195 0.823711 0.432938 0.38009 1.74405 8.44424 2.00986 1.88681 0.93321 0.93321 0.93321 0.93321	15.1052 2.25452 4.90555 3.30871 2.66551 4.79110 2.281775 5.43415 2.281775 4.03405 9.50973 9.50973 1.33614 2.96265 15.3616 1.3616	11.6562 1.19293 3.12617 4.06879 2.16743 6.83007 16.2580 1.21463 2.366499 1.21463 2.36612 2.19797 4.556 2.9757 1.5760 2.1576	10.177	0.0334 0.0255 0.0355 0.0355 0.0365 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065 0.00065	Tmem82 Tmpes6 Tmpes6 Timpes6 Timpes6 Timfes4 Timfes4 Timfes4 Timfes4 Timfes4 Timfes4 Timfes4 Timfes4 Timfes4 Timfes5 T	Intron Intron Openstream Upptream 3 VTR Econ/CO 3 VTR	80231 3704 10556 298611 -15655 28969 17755 -2715 -666 75718 12907 10003 43231	2.89775 3.42888 3.005525 56.2122 5.73100 6.70014 1.94100 10.3435 1.57568 22.5341, 0.609372 33.3341 2.64146 3.77033 3.87332 1.83780	7.44299 6.1655 3.42266 6.1655 3.42266 3.45266 3.42266 3.4596 6.5597 3.8806 9.19422 6.6412 1.19386 7.9422 1.6597 3.8061 1.2599 8.096 1.15846 0.4499 2.25833 6.2597 3.0944 1.2599 8.096 3.3532 8.177 3.3532 8.177 3.45987 3.45987 3.45987 3.5532 8.177	99 5.38334 409 8.26254 419 8.26254 421 921 8.26254 43 121.6565 43 122.6565 43 122.0365 43 122.0365 43 122.0365 44 1395 45 122 13.8838 45 125 13.8838 45 125 13.8838 46 1.09001 47 126 126 126 126 126 126 126 126 126 126	6.24819 10.5099 48.3704 8.22745 210.14 1.64147 10.6452 3.371756 4.35651 5.55622 7.8225 38.4116 8.0432 23.2444 3.67315 6.84474	4.47159 10.1413 21.7379	0.00005 0.3347 0.00005 0.5961 0.0025 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005 0.0005
Communication   Communicatio	14 33111 33 3111 30 66511 6 57966 6 57966 5 5247 0 79631 1 0.048611 1 0.166 1 27.70 0 7973 1 0.166 1 27.70 1 0.7888 6 1.5231 54 0.71835 8 3527 7 0.843 24 0.44 24 0.44 4 2.3844 6 2.1460 4 2.1460 4 2.1460	8.618.49 0.507913 1.93105 0.967109 1.36795 1.40250 1.10799 1.10799 1.10799 1.10799 1.10799 1.10814 1.25314 1.25314 1.2623 0.319866 3.2114 6.5478 0.96519 1.12995 1.	5.05405 0.674374 1.21455 2.20221 3.87776 8.21728 5.0214 2.5595 0.823711 0.452938 0.48207 1.74405 8.44424 2.00986 1.88861 0.203321 0.0533377 4.8842 4.8862 1.9865 8.77738 0.7867 0.613377 4.8842 1.9865 0.49496	15.002 2.3842 4.0055 3.0055 3.0055 3.0055 4.79146 10.000 8.31409 2.8377 5.4443 1.3056	11.5502 1.12923 2.1303. 2.1304. 3.1503	10.1727 0.95561 5.04869 2.74465 1.45828 8.42783 1.12506 1.2506 1.57872 3.1506 1.0017	0.03131 0.00555 0.0055 0.005	Fmem82 Fmpo Fmpo Fmpost6 Fmfrst4 Fortalp1 Fpont Freih Freih Frim17 Frim17 Frim2 Frim7 Frim2 Frim7 Frim2 Frim3 Frim2 Frim3 Frim4 Frim3 Frim4 Frim4 Frim7 Frim4 Frim7 Frim6 Frim7 Frim6 Frim7 Frim8 Frim		80231 1704 18056 1906 1907 1908	2.89775 3.42886 3.00552 56.2122 5.73106 6.70014 1.94100 1.03433 1.57568 22.5344 0.609377 33.3344 2.64146 3.77033 3.87332 1.83788	7.44299 6.1655 3.42066 3.455 3.42066 3.455 3.42066 3.455 3.52537 3.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5573 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5574 8.8566 5.5575 9.0546	09 5.38334 09 8.25224 10 8.25224 10 8.25224 10 8.25224 10 10 10 10 10 10 10 10 10 10 10 10 10 1	6.24819 16.0999 48.3704 21.014 1.64147 19.4552 7.3275 4.53651 5.55622 7.88255 38.4116 8.0432 29.3444 3.67315 6.84474 13.55644 13.55644 13.55664 13.55664	4.47159 10.1413 21.7379	0.00000 0.0347 0.00000 0.0561 0.00000
DEMANDOSINES - 911-9103-5-1007-0  CHARLES - 911-910-5-1007-0  CHARLES - 911-910-910-910-910-910-910-910-910-910-	14 0.572161 14 3.31161 24 3.3161 25 25 25 25 25 25 25 25 25 25 25 25 25 2	8.61849 0.507913 1.93105 0.967105 2.67652 7.80599 1.10759 1.10759 1.25314 1.24459 1.43862 1.10759 1	\$.05405 0.67437 121455 2.0021 3.87776 2.21723 5.0214 5.0214 5.0519 0.823711 0.43394 0.38009 1.74405 8.44414 2.0986 1.88681 0.93321 0.9	15.1902 2.38462 2.48462 2.48672 2.48672 2.48773 2.48773 2.48773 2.48773 2.48773 2.487744 2.48774 2.48774 2.48774 2.48774 2.48774 2.48774 2.48774 2.487	11.5502 1.00203 4.06879 2.0733 4.06879 1.0740 1.	10.1727 0.95561 5.04867 2.74467 1.45828 8.42783 1.12506 1.2506 1.57872 3.35602 1.00199 1.00191 1.00	C03131 0.00555	Freem82 Freps 1 Freps 1 Freps 1 Freps 1 Freps 1 Freps 1 Fres 2 Fres 1 Fres 2 Fres 1 Fres 2 Fres 3 Fr		80213 370-6 20013 10013	2.89775 3.42884 3.00552 56.2122 5.73106 6.70014 1.94106 10.3433 1.57568 1.57568 1.57568 1.577036 1.83788 1.83788 1.83788 1.83783 1.83788 1.83788 1.83788 1.83788 1.83788 1.83788 1.83788 1.83886	7.4299 6.1655 3.4206 1.4655 3.4206 3.455 3.4206 3.455 3.4206 3.457 6.5937 8.806 6.5937 8.806 1.0336 0.7894 1.12396 0.7894 1.12396 0.7894 1.2399 0.0499 2.5838 2.22 2.1579 1.0394 3.3382 8.179 4.58867 2.21579 1.042 2.7579 2.410 2.75797 2.410 2.75797 2.410 2.75795 3.400 2.75795 3.400 2.75795 3.400 2.75795 3.400 2.75795 3.400 2.75795 3.400	09 5.38334 09 3.75224 31 22.6565 25 23.0396 25 2.11966 25 2.11966 25 2.11966 25 2.11966 25 2.11966 25 2.11966 26 2.1097 26 2.1097 27 2.097 28 2.10	6.24819 10.6099 48.3704 8.22745 21.014 1.64147 19.6452 7.32756 4.53651 5.55622 7.88255 38.4116 8.0432 23.3444 3.67315 6.84473 1.58404	4.47159 10.1413 21.7370 6.00418 20.5004 1.53105 16.516	0.00000 0.0001 0.00001 0.00001 0.00001 0.00001 0.00001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001 0.000001
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NOMINOCIDENT - VILLAGO - V	14	8.11400 6.5091:10 1.0071:00 1.	\$ 0.5405   0.62171   0.621	15.002 15.002	1100   10	18.0777 18.0771 18.077	0.031315 (0.000) 0.000000000000000000000000000000	Francis2		80031 30052 30052 30052 30052 30053	2.8977726 3.428884 5.521227 5.731081 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
NOMINOCIDENT - VITE NOMINO TO THE PROPERTY OF	14 A MARTINI A M	8.1840 6.509-15. 0.807100 1.0288. 7.80600 7.80600 1.1528. 1	\$.05405, 0.69413, 0.6	11.502 1.502 1.502 1.502 1.503 1	1100 1000 1000 1000 1000 1000 1000 100	18.2777 18.277 1	0.0313150 0.000150 0.	Francis2		8031 8031 8031 8031 8031 8031 8031 8031	2.8977726 3.428884 5.521227 5.731081 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
NOMINOCIDIDA - VI 1 2019. LA 1927 SI 1000 NOMINOCIDIDA - VI 1 2019 SI 1000	14	6.1840 0.97100 0.97100 0.97100 7.96000 7.96000 1.15031 1.15	\$ 0.940; 0.951;	15.002 1	110.00   110	10.2777 1 10.277	0.031316 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000)	Transm22   Transm22   Transm22   Transm22   Transm2		80013 80013	2.8977726 3.428884 5.521227 5.731081 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
VANISHO   VALUE   VA	14	6.1840  0.957100  0.957100  0.957100  1.00200  7.00000  7.00000  1.00000  1.00000  1.00000  1.00000  1.00000  1.00000  1.00000  1.00000  1.000000  1.00000000	\$ 0.540) 1.21455 2.2021) 2.21455 2.2021) 3.0144 3.0214 3.0	18 500   18	110.00   110	18.2771 18.277	0.031312 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000)	Transm22	Delication	80031   9003	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
VALUE   VALU	14	6.1440 6.051000 6.051000 6.051000 6.051000 6.051000 6.051000 6.0510000 6.0510000 6.05100000 6.05100000000000000000000000000000000000	5,000 (6 Except 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15.002 1	1100.00 1100.0	18.2771 18.277	0.03131 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000) 0.00000 (0.000)	Trans22	Delication	B031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
NOTE	14	11.00 (1.00	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	18 500   18	110.00   1.00	18.2771 18.277	0.03131	Transm2		80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	\$2000 \$2000
NOMINOCIDENT - VITA NOME A STATE OF THE ANALYSIS OF THE ANALYS	14	11.00 (1.00	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.500   1.500	110.00   1.00	18.2777 18.2	0.03151	Transmitt   Transm	Delication	80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	\$2000 \$2000
NOMINOCIDENTS - 211 NOTES - 1212 NOTES - 121	14	11100 11100	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	15.502 1.002 1	11000 11000	18.0777 18.0771 18.077	0.03131 (0.000) 0.00010 (0.000) 0.00010 (0.000) 0.00010 (0.000) 0.00010 (0.000) 0.00010 (0.000) 0.00000 0.00000 0.00000 0.000000 0.000000	Transmil	Description	80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	\$2000 \$2000
NOMINGO 1997 - VI 1897/18 1997	14	11100 11100	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.502 1.002	11000 11000	18.0797 18.079	0.03131 (0.000) 0.00000 (0.000)	Transmit	Description	80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	\$2000 \$2000
NOMINOCIDENT - VITE NOME - 1977 NOTES - 1977	14	11.00 (1.00	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.500 1	11000 11000	18.2777 18.277 1	0.03131 (0.000) 0.00000 (0.000	Transpire   Tran		80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	\$2000 \$2000
NOTE	14	1100 100 100 100 100 100 100 100 100 10	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.500 1.000 1	1102   11	10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.2777 10.2776 10.277	0.03141	Transm22		80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
NOMINOCIDENT - 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	14	11.00 (1.00	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	15.002 1	1100   11	18.0797 18.079	0.03131 (0.000) 0.00000 (0.000)	Transmit	Delication	80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
SCHOOLOGIST - 12 1979 1	14	11.100   1.100	\$1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.500 1	11000 11000	18.0777 18.077	0.031314 (0.000) 0.000000000000000000000000000000	Transmit	Delication	80031 80031	2.8977726 3.428884 5.521227 5.73108 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
Commonstrate	14	11.00 (1.00	1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	15.502 1.002 1	1100.00 1100.0	18.0379 18.0000 18.000 18.000 18.000 18.000 18.000 18.000 18.000 18.000 18.0000	0.03131 (0.0000) 0.00000 (0.0000)	Transmit	Delication	BO313	2.8977726 3.428884 5.521227 5.731081 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000
SCHOOLOGIST - 12 1979 1	1	11.100 (1.1000 (1.1000 (1.1000 (1.1000 (1.1000 (1.1000 (1.1000 (1.1000 (	\$1,000 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	11.500 1	11000 11000	18.0777 18.077	0.03131	Transm22   Transm22   Transm22   Transm22   Transm22   Transm22   Transm24	Delication	80031 80031	2.8977726 3.428884 5.521227 5.731081 5.	7-4429 6.165.4 1-4218 4.000-1 6.537 76.97-8 6.557 8.000-1	09 5.383130 0 8 8.2022 0 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	6.24019 6.8706 6	4.07150 10.1413 10.141	0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000

NONMMUG038055.2 chr7:48877948-48913065	9.14992	11.4905	17.1395	6.2923	5,77174	7.35195	0.00105	#N/A	#N/A	#N/A							
NONMMUG019445.1 chr18:21125160-21126252	8.75862	3.83693	12.622	4.8979	4.32764	4.71418	0.00115	#N/A	#N/A	#N/A		_	_				
NONMMUG002010.2 chr1:151133294-151155212	8 34749	3.48402	4 14148	2 62878	2 13398	0.835057	0.00115	#N/A	an/A	#N/A			-				
				27,3156								-	-			-	
NONMMUG021419.1 chr19:43785901-43790802	6.7491	7.16387	2.0088		6.89664	17.6425	0.00125	#N/A	#N/A	IIN/A	-	-	-	-		-	
NONMMUG071589.1 chr3:129633232-129633453	0	0	0	2.34885	4.93835	14.514	0.00145	#N/A	an/A	#N/A		-				-	-
NONMMUG061325.1 chr16:21829664-21830582	6.30366	5.19147	3.1034	16.2003	7.54033	14.1646	0.0016	#N/A	an/A	#N/A		-		-		-	
NONMMUG042140.2 chr9:14331440-14333101	1.64305	3.16225	1.42047	6.84189	4.57664	5.00392	0.0017	#N/A	#N/A	#N/A		-					
NONMMUG021324.2 chr19:39229253-39274737	0.237078	0.0928916	0.0283247	5.17664	4.55571	4.08405	0.0017	#N/A	#N/A	#N/A		-					
NONMMU6004693 2 (hr10:111539050:111761450	9.09901	6.76102	5.4854	6.74501	2.81808	1 97638	0.0018	μη/Δ	an/a	IIN/A			_				
NONMMUG012502.2 chr14:28649675-28704479	1.37305	0.71651	0.737116	6.60386	3.65213	4.89828	0.0018	#N/A	an/A	#N/A		-	-	-			
NONMMOG012502.2 CHE14:28649675-28704479											•	-	-		•	-	
NONMMUG021195.2 chr19:31950083-31952361	4.64791	12.2164	8.83903	18.0174	21.7382	17.9732	0.00195	#N/A	an/A	IIN/A		-				-	·
NONMMUG010775.2 chr13:40956413-41001152	3.86411	3.91627	4.02024	1.75484	2.91906	1.85977	0.00195	#N/A	an/A	#N/A		-	ŀ			ŀ	i I
NONMMUG045811.2 chrx:130464668-130465828	0.359943	1.64272	1.91059	5.15479	3.64548	2.83841	0.00245	#N/A	#N/A	#N/A		-					
NONMMU6037743 2 VW7-35127253-35143138	4.86084	3 26624	2 56812	1.26271	1 61335	0.554115	0.00245	#Ν/Δ	aN/A	IIN/A		_	_				
NONMMUG034022.2 chr5:135642434-135672987	3.388	2.04106	2.99921	4.77189	9.38609	5.60337	0.00265	#N/A	an/A	IIN/A			_				
	3.305		2.99921	4.77189		5.00337	0.00265					-	-			-	
NONMMUG000473.2 chr1:39581809-39592160	9.35925	11.274	2.97329	4.82658	1.12055	1.12841	0.0027	#N/A	#N/A	IIN/A		-				-	-
NONMMUG019446.2 chr18:20985620-20987349	5.788	25.6696	13.7963	28.5681	41.0895	29.222	0.003	#N/A	an/A	IIN/A		-		-		-	
NONMMUG040267.2 chr8:33697246-33698161	17.4622	20.2077	14,7419	46.4745	29.638	39.1848	0.00315	#N/A	#N/A	#N/A		-				-	
NONMMUG036870.2 chr6:141866356-141878021	1.7196	3.06255	1.35035	5.3563	3.95441	4.82829	0.0032	#N/A	#N/A	#N/A		-					
NONMMUG000267.2 chr1:24613965-24614332	12125.9	16991.5	19570.4	17078.5	21507.7	19384.3	0.0036	#N/A	#N/A	#N/A							
NONMMUG037492.2 chr7-27124480-27130698	2.2789	1 57514	1.07467	1.17402	1 70808	0.874261	0.00365	#N/A	#N/A	#N/A		-	_				
											•		-		•	-	
NONMMUG006909.2 chr11:79258571-79273943	0.242323	0.220066	1.94653	2.84526	1.61982	4.56226	0.0037	#N/A	an/A	IIN/A	,	-			*	-	-
NONMMUG009535.2 chr12:84538162-84546502	2.82078	1.51846	0.828797	0.44885	0.503863	0.624014	0.00375	#N/A	an/A	IIN/A	-	1-	ŀ _	-	-	· _	-
NONMMUG011325.2 chr13:68228417-68252949	11.306	5.42038	26.0117	7.13084	8.73972	9.28755	0.00495	#N/A	an/A	IIN/A		-	F	-		-	F 1
NONMMUG021206.2 chr19:32543317-32563256	3.1932	1.76474	0.694701	7.2204	5.21697	5.37393	0.0052	#N/A	#N/A	#N/A		l.	L.				
NONMMUG060351.1 chr15:102396108-102397000	3.88555	1.83227	0.818113	1 56703	0.155529	0.563179	0.00525	#N/A	#N/A	#N/A			_				
												-	-				
NONMMUG039739.2 chr8:3455523-3456604	6.68105	6.63452	6.69101	4.58169	4.05776	3.57993	0.00545	#N/A	#N/A	IIN/A	-	-	-	-	-	-	-
NONMMUG002842.2 chr1:191782379-191784253	5.89655	9.88184	16.6919	25.8855	22.9381	22.9266	0.00615	#N/A	#N/A	#N/A		-	_	-	-		
NONMMUG036745.2 chr6:133107915-133112301	1.95307	2.98033	2.84366	1.8589	1.79	1.07466	0.0063	#N/A	#N/A	#N/A		-	F				F
NONMMUG031105.2 chr4:138891065-138892134	1.59425	1.63722	1.90933	0.622591	0.617179	0.716943	0.00635	#N/A	#N/A	#N/A	-	-	1				
NONMMUG039784.1 chr8:5083218-5085230	1.13234	0.318826	1.76469	4.07056	1.6659	2 74592	0.0068	#N/A	#N/A	IIN/A		l.	t.		t.	t.	
NONMMU6014263 2 /hr15/33593890,33653436	2 27574	1.81246	1.57788	0.620026	0.532881	1 30475	0.0000	#N/A	an/A	#N/A		_	_			_	
												F	r	r	r		
NONMMUG028636.2 chr4:19979444-20005739	3.13309	0.382339	1.35628	0.54585	0.61049	0.287437	0.0075	#N/A	#N/A	WN/A	-	-	ŀ.	-		-	-
NONMMUG023006.2 chr2:53132672-53133803	1.59177	1.69374	2.53904	6.21016	3.95228	4.22338	0.0076	#N/A	an/A	IIN/A		<u> </u>	Ŀ			<u> </u>	-
NONMMUG028509.2 chr4:11172421-11174377	0.584444	3.02659	3.70247	6.01816	4.81423	6.06576	0.00755	#N/A	an/A	IIN/A		-	F	-		-	i
NONMMUG027425.2 chr3:100785714-100786513	2.73392	0.984849	0.232349	6.70158	6.48344	7.41574	0.0078	#N/A	#N/A	WN/A							
NONMMUG034063 2 /hrs-136015028.136037113	0.784743	0.458782	0.336724	0.853657	1.88018	1.96114	0.0078	#N/A	an/A	#N/A			_				
											-	-	-	-		-	
NONMMUG029222.2 chr4:49507412-49511913	4.85039	0.574048	3.65917	1.27793	0.415054	0.444172	0.00775	#N/A	#N/A	IIN/A		-	-			-	
NONMMUG021854.2 chr2-5018445-5019806	8.61736	7.93229	8.15656	7.36488	3.93096	4.40384	0.0092	#N/A	an/A	#N/A		-	ŀ			ŀ	i I
NONMMUG015071.2 chr15:82642113-82661121	4.81196	2.21534	2.36126	1.94771	2.23118	0.75797	0.00935	#N/A	#N/A	#N/A							
NONMMUGD40465 2 /h/8-45266689.45269203	11.0557	19 1467	14.8223	14 6354	10.4525	8.01018	0.01005	IIN/A	aN/Δ	IIN/Δ							
NONMMUG031169.2 chr4:141278438-141279795	0.139881	0.210238	0.489507	2.07969	4.39639	1.61052	0.01015	#N/A	#N/A	IIN/A		_	_				
			28,7038	5.86231	5.62707	5,57837	0.01215					-	-	-	•	-	
	1.98569	1.48997						#N/A	an/A	IIN/A	,	-			*	-	
NONMMUG033279.1 chr5:108494734-108538236	2.01912	4.18322	4.13489	3.22783	10.0974	7.68837	0.0134	#N/A	an/A	IIN/A	-	-	-			-	
NONMMUG074967.1 chr5:135626343-135627376	1.07031	3.5578	5.01335	1.08705	2.3836	1.83502	0.01365	#N/A	an/A	#N/A							
NONMMUG042840 2 1/h/9 54947748,54949913	7.74969	10 1344	3.89704	5 96597	4 7147	4 6878	0.01425	#Ν/Δ	aN/A	IIN/A							
	2.02202	44.0000	C C043	27.0054	44.0334	42.7442			491/4								
NONMMUG039489.2 chr7:132983833-132985471	7.62763	11.0009	6.6847	27.8051	14.8234	12.7147	0.0145	#N/A	an/A	IIN/A		-	-	-		-	-
NONMMUG039489.2 chr7:132983833-132985471 NONMMUG039113.1 chr7:122080058-122080376	7.62763 21.5473	11.713	8.72073	6.93105	6.77983	6.96158	0.01465	#N/A	an/A	IIN/A		-		-	-	-	
NONMMUG039489.2 chr7:132983833-132985471		11.713 2.31714														-	
NONMMUG039489.2 chr7:132983833-132985471 NONMMUG039113.1 chr7:122080058-122080376 NONMMUG026099.2 chr3:14847195-14852247	21.5473	11.713 2.31714	8.72073 1.17002	6.93105 8.36209	6.77983 4.51322	6.96158 2.75479	0.01465 0.01495	#N/A #N/A	#N/A #N/A	WN/A WN/A							
NONMMUG039489.2 chr?:132983833-132985471 NONMMUG039113.1 chr?:122080058-122080376 NONMMUG026099.2 chr3:14847195-14852247 NONMMUG031562.2 chr3:145607176-5260485	21.5473 0 2.26333	11.713 2.31714 3.74719	8.72073 1.17002 4.32087	6.93105 8.36209 3.18406	6.77983 4.51322 2.25048	6.96158 2.75479 1.29821	0.01465 0.01495 0.0156	#N/A #N/A #N/A	an/A an/A an/A	IIN/A IIN/A IIN/A						-	-
NONMMUG039489.2 (hr7-132983833-132985471 NONMMUG039113.1 (hr7-12208058-12080376 NONMMUG026099.2 (hr3-18457295-12852247 NONMMUG013162.2 (hr3-18-52607176-5260845 NONMMUG027741.2 (hr3-116903949-116907701	21.5473 0 2.26333 2.17858	11.713 2.31714 3.74719 2.08552	8.72073 1.17002 4.32087 1.68693	6.93105 8.36209 3.18406 4.76601	6.77983 4.51322 2.25048 3.83281	6.96158 2.75479 1.29821 4.46408	0.01465 0.01495 0.0156 0.01575	IIN/A IIN/A IIN/A	RN/A RN/A RN/A	IN/A IN/A IN/A IN/A						-	
NONMMUG039489.2 chr?:132983833:132985471 NONMMUG039313.1 chr?:122080058:122080376 NONMMUG036099.2 chr2:18487195.14852247 NONMMUG013162.2 chr14:52607176-62608485 NONMMUG037741.2 chr2:116065394:15007701 NONMMUG03893.2 chr2:421234943-42123103	21.5473 0 2.26333 2.17858 0.406497	11.713 2.31714 3.74719 2.08552 2.42401	8.72073 1.17002 4.32087 1.68693 1.46111	6,93105 8,36209 3,18406 4,76601 4,20899	6.77983 4.51322 2.25048 3.83281 3.50235	6.96158 2.75479 1.29821 4.46408 2.19316	0.01465 0.01495 0.0156 0.01575 0.0163	#N/A #N/A #N/A #N/A	BN/A BN/A BN/A BN/A BN/A	MN/A MN/A MN/A MN/A MN/A		- - - - -			-	-	
NONMMUG039489 2 dr.7.13298833.3.13298547; NONMMUG039113.1 dr.7.12208058.2.12080376 NONMMUG020909 2 dr.5.18487195.1485247 NONMMUG01162.2 dr.1.4.52607176.62608485 NONMMUG07741.2 dr.1.19608394.1590700; NONMMUG03893.3 dr.1.2.4223491.9.41223303 NONMMUG058893.2 dr.1.2.4223491.9.41223303 NONMMUG058682 dr.1.4.4223491.9.41223303	21.5473 0 2.26333 2.17858 0.406497 2.01835	11.713 2.31714 3.74719 2.08552 2.42401 2.43412	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113	6.93105 8.36209 3.18406 4.76601 4.20899 6.62833	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688	6,96158 2,75479 1,29821 4,46408 2,19316 4,05899	0.01465 0.01495 0.0156 0.01575 0.0163 0.0166	IIN/A IIN/A IIN/A IIN/A IIN/A	RN/A RN/A RN/A RN/A RN/A RN/A	IM/A IIN/A IIN/A IIN/A IIN/A		-			-	-	
NONMMUG039489.2 chr?:132983833:132985471 NONMMUG039313.1 chr?:122080058:122080376 NONMMUG036099.2 chr2:18487195.14852247 NONMMUG013162.2 chr14:52607176-62608485 NONMMUG037741.2 chr2:116065394:15007701 NONMMUG03893.2 chr2:421234943-42123103	21.5473 0 2.26333 2.17858 0.406497	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834	6.93105 8.36209 3.18406 4.76601 4.20899 6.52833 5.57461	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445	6,96158 2,75479 1,29821 4,46408 2,19316 4,05899 3,4012	0.01465 0.01495 0.01556 0.01575 0.0163 0.01666	#N/A #N/A #N/A #N/A	BN/A BN/A BN/A BN/A BN/A	MN/A MN/A MN/A MN/A MN/A		- - - - - - -				-	
NOMMAUGI 19489 2 047-11268383-11298547 NOMMAUGI 19489 2 047-11268383-11298547 NOMMAUGI 19500-113-12 047-1126833-11298547 NOMMAUGI 1950-113-12 047-142607176-14260485 NOMMAUGI 1952-114-12 048-119608394-11960796 NOMMAUGI 1952-114-124-14-1211383 NOMMAUGI 1953-114-14-14-1211383 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803 1.98382	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776	6.93105 8.36209 3.18406 4.76601 4.26399 6.62833 5.57461 1.63173	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445	6,96158 2,75479 1,29821 4,46408 2,19316 4,05899 3,4012 0,906519	0.01465 0.01495 0.0156 0.01577 0.0168 0.0168 0.01685	UN/A UN/A UN/A UN/A UN/A UN/A UN/A UN/A	85/A 85/A 85/A 85/A 85/A 85/A 85/A 85/A	804/A 804/A 804/A 804/A 804/A 804/A 804/A		- - - - - - - - -					
NOMMAUGI 19489 2 047-11268383-11298547 NOMMAUGI 19489 2 047-11268383-11298547 NOMMAUGI 19500-113-12 047-1126833-11298547 NOMMAUGI 1950-113-12 047-142607176-14260485 NOMMAUGI 1952-114-12 048-119608394-11960796 NOMMAUGI 1952-114-124-14-1211383 NOMMAUGI 1953-114-14-14-1211383 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692 NOMMAUGI 1979-12 047-1726060-173714692	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776	6.93105 8.36209 3.18406 4.76601 4.20899 6.52833 5.57461	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445	6,96158 2,75479 1,29821 4,46408 2,19316 4,05899 3,4012	0.01465 0.01495 0.0156 0.01577 0.0168 0.0168 0.01685	UN/A UN/A UN/A UN/A UN/A UN/A UN/A UN/A	85/A 85/A 85/A 85/A 85/A 85/A 85/A 85/A	804/A 804/A 804/A 804/A 804/A 804/A 804/A							
\$\text{SOMMAGGS1989} 2 \tag{1.711988883-11989471} \$\text{SOMMAGGS1989} 2 \tag{1.711988883-11989471} \$\text{SOMMAGGS1999} 2 \text{SOMMAGGS1999} 2 \text{SOMMAGGS1999} 2 \text{SOMMAGGS1979} 2 \text{SOMMAGGS17916} 2 \text{Pst-1484715-1485247} \$\text{SOMMAGGS7741-2} \text{SOMMAGGS7741-2} \text{SOMMAGGS1774-2} \text{SOMMAGGS1983-19907701} \$\text{SOMMAGGS1983-2} \text{SOMMAGGS1974-2} \text{SOMMAGGS1973-2} SOMMAGGS19	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063 0.286553	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803 1.98382 0.566492	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776 1.11983	6.93105 8.36209 3.18406 4.76601 4.2699 6.52833 5.57461 1.63173 1.5707	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026	6.96158 2.75479 1.29821 4.46408 2.19316 4.05899 3.4012 0.906519 2.35862	0.01465 0.01495 0.0156 0.01577 0.0163 0.0166 0.01665 0.01685	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	8N/A 8N/A 8N/A 8N/A 8N/A 8N/A 8N/A 8N/A	800/A 800/A 800/A 800/A 800/A 800/A 800/A 800/A							
SOMMMAGGIPHER   2	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063 0.286553 4.53649	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803 1.98382 0.566492 2.52768	8.72073 1.17002 4.32087 1.69693 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549	6.93105 8.36209 3.18406 4.76601 4.2699 6.5233 5.57461 1.63173 1.5707 1.97115	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026 2.44013	6,96158 2,75479 1,19821 4,46408 2,19316 4,05899 3,4012 0,905519 2,35862 1,17163	0.01465 0.01495 0.01559 0.0156 0.0166 0.01665 0.01665 0.0172	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	83\/A	805/A 805/A 805/A 805/A 805/A 805/A 805/A 805/A 805/A							
COMMANGOSHIP   COMM	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063 0.286553 4.53649 17.9442	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.978803 1.98382 0.566492 2.52768 18.2817	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549 12.9453	6.93105 8.36209 3.18406 4.76601 4.26809 6.62833 5.57461 1.63173 1.5707 1.97115	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222	6.96158 2.75479 1.19821 4.46408 2.19316 4.05899 3.4012 0.905519 2.35862 1.17163	0.01465 0.01495 0.0155 0.0155 0.0165 0.0166 0.01665 0.01688 0.0177	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	88V/A 88V/A 88V/A 88V/A 88V/A 88V/A 88V/A 88V/A 88V/A 88V/A 88V/A	804/A 804/A 804/A 804/A 804/A 804/A 804/A 804/A 804/A 804/A							
COMMANGED 1992 2 (17) 1239883 1.3298497 1 (17) 1239883 1.3298497 1 (17) 1239883 1.3298497 1 (17) 1239883 1.3298497 1 (17) 1239883 1.3298497 1 (17) 1239883 1.3298497 1 (17) 123988 1 (17) 123988 1 (17) 12398 1 (17)	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063 0.286553 4.53649 17.9442 0.856853	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.978803 1.98382 0.566492 2.52768 18.2817 1.39941	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549 12.9453 1.96938	6 93105 8 36209 3 18406 4 76601 4 26899 6 52833 5 57461 1 153173 1 5707 1 97115 3 7.7953 3 27298	6.77983 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222 2.63906	6.96158 2.75479 1.19821 4.46408 2.19316 4.05819 3.4012 0.906519 2.235862 1.17163 28.5757 2.33597	0.04465 0.04495 0.01557 0.01557 0.01665 0.01665 0.01665 0.0177 0.0177 0.01875	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	87/A 87/A 87/A 87/A 87/A 87/A 87/A 87/A	801/A 801/A 801/A 801/A 801/A 801/A 801/A 801/A 801/A 801/A 801/A		- - - - - - - - - - - - - - - - - - -					
COMMANDISTREET, 2017-1159-1151-1251-1251-1251-1251-1251-1251	21.5473 0 2 26333 2.17858 0.406497 2.01335 2.82813 1.6063 0.286553 4.53649 17.9442 0.856853 0.705873	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803 1.98382 0.566492 2.52768 18.2817 1.39941	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549 12.9453 1.96938 1.05375	6 93105 8 36209 3 18406 4 76601 4 20899 6 62833 5.57461 1.63173 1.5707 1.97115 37.7953 3.27898 3.90374	6.77983 4.51322 2.25048 3.83281 3.50335 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222 2.63966 2.28923	6.96158 2.75479 1.19811 4.46408 2.19316 4.05899 3.4012 0.905519 2.35862 1.17163 28.5757 2.93554 1.193463	0.0465 0.0499 0.0156 0.055 0.0575 0.0166 0.0166 0.0166 0.0167 0.0177 0.0177 0.0177	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	88\(/A\)	#80/A #81/A							
COMMANGEMENT   COMM	21.5473 0 2 26333 2.17858 0.406497 2.01835 2.82831 1.6063 0.286553 4.53549 17.9442 0.856853 0.705873 2.90227	11.713 2.317.14 2.317.14 2.08552 2.42401 2.0976803 1.98382 0.566402 2.527768 18.2817 1.39941 1.09007 3.666644	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.866834 2.59776 1.11983 2.02549 12.9453 1.96938 1.05375 1.49063	6 93105 8 36209 3 18406 4 76601 4 20899 6 62831 5 57461 1 63173 1 5707 1 97115 3 77953 3 27298 3 90374 7 23025	6.77933 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222 2.63906 2.28913 6.28192	6.96138 2.75479 1.29821 4.46408 2.19316 4.05899 3.4012 0.906519 1.17163 28.5757 2.93594 1.93463 4.92125	0.0465 0.0499 0.0156 0.0556 0.0556 0.0565 0.06656 0.06656 0.06858 0.0177 0.0177 0.01875 0.00555	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	85\/A 85\/A	##\/A							
COMMANGEMENT   COMM	21.5473 0 2 26333 2.17858 0.406497 2.01835 2.82831 1.6063 0.286553 4.53549 17.9442 0.856853 0.705873 2.90227	11.713 2.317.14 2.317.14 2.08552 2.42401 2.0976803 1.98382 0.566402 2.527768 18.2817 1.39941 1.09007 3.666644	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.866834 2.59776 1.11983 2.02549 12.9453 1.96938 1.05375 1.49063	6 93105 8 34209 3 18406 4 76601 4 20899 6 62833 5 37461 1 5970 1 59715 3 27968 3 90174 7 2 3925 6 13532	6.77983 4.51322 2.25044 3.83281 3.50235 4.30588 2.91445 1.55446 2.34026 2.44013 28.2222 2.83923 6.28192 6.43506 6.4350	6.96158 2.75479 1.29821 4.46468 2.19316 4.05899 3.4012 0.905519 2.35862 1.17163 28.5757 2.93594 1.93463 4.92112 5.68922	0.0465  0.0495  0.0156  0.0556  0.0557  0.0156  0.0166  0.0166  0.0166  0.0166  0.0172  0.0173  0.0173  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	85\/A 85\/A	##\/A			-				
COMMANGEMENT   COMM	21.5473 0 2 26333 2.17858 0.406497 2.01335 2.82813 1.6063 0.286553 4.53649 17.9442 0.856853 0.705873	11.713 2.31714 3.74719 2.08552 2.42401 2.43412 0.976803 1.98382 0.566492 2.52768 18.2817 1.39941	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549 12.9453 1.96938 1.05375	6 93105 8 36209 3 18406 4 76601 4 20899 6 52331 5 57461 1 5317 1 5707 1 97115 3 7.7951 3 7.7951 3 7.7952 6 15332 6 15332	6.77983 4.51322 2.25044 3.83281 3.50235 4.30588 2.91445 1.55446 2.34026 2.44013 28.2222 2.83923 6.28192 6.43506 6.4350	6.96158 2.75479 1.19811 4.46408 2.19316 4.05899 3.4012 0.905519 2.35862 1.17163 28.5757 2.93554 1.193463	0.0465  0.0495  0.0156  0.0556  0.0557  0.0156  0.0166  0.0166  0.0166  0.0166  0.0172  0.0173  0.0173  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175  0.0175	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	88\(/A\)	#80/A #81/A							
COMMOGRISHER 2. 07 2198983 3178967 2 1000000 2 1000000 2 10000000 2 100000000	21.5473 0 2 26333 2 17858 0.406497 2 01835 2 82413 1.6063 0.286553 4.53649 17.5442 0.856853 0.705873 2 99227 1 99083	11,713 2,31734 3,74719 2,08552 2,42401 2,43412 0,976803 1,98382 2,52768 18,2817 1,09007 3,66649 2,7839	8.72073 1.17002 4.32087 1.68993 1.46111 2.42113 0.860834 2.59776 1.11983 2.02549 12.9453 1.9938 1.05375 1.49063 3.57262	6 93105 8 36209 3 18406 4 76601 4 20899 6 52331 5 57461 1 5317 1 5707 1 97115 3 7.7951 3 7.7951 3 7.7952 6 15332 6 15332	6.77933 4.51322 2.25048 3.83281 3.50235 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222 2.63906 2.28913 6.28192	6.96158 2.75479 1.29821 4.46468 2.19316 4.05899 3.4012 0.905519 2.35862 1.17163 28.5757 2.93594 1.93463 4.92112 5.68922	0.0465 0.0499 0.0156 0.0556 0.0556 0.0565 0.06656 0.06656 0.06858 0.0177 0.0177 0.01875 0.00555	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	85/A 85/A 85/A 85/A 85/A 85/A 85/A 85/A	804/A							
COMMODIFICATION OF THE STATE OF	21.5473 0 2 2.6333 2 17858 0.406497 2.01835 2.82813 1.6061 0.286553 4.53649 17.9442 0.856853 0.705873 2.99227 1.98083 1.09234 2.0234	11.713 2.31714 3.24719 2.08552 2.42401 2.43412 0.976801 1.98382 0.566492 2.52768 18.2817 1.39941 1.09007 3.66649 2.72788 18.2817 1.39941 1.09007 3.66649 2.72839 1.0978	8.72073 1.17002 4.37087 1.68693 1.46111 2.42113 0.860834 2.02549 1.11983 2.02549 1.9638 1.05375 1.49063 3.57262 1.08647 1.378647	6.93105 8.82009 3.34906 4.76601 4.76601 4.20899 6.62833 5.57461 1.53707 1.97115 3.77653 3.70654 3.7067 4.72005 6.18331 1.53467 1.53467 0.739862	6.77983 4.51922 2.25048 3.83781 3.9028 4.30688 2.91445 1.55446 2.34026 2.44013 28.2222 2.83923 6.28192 6.4519 6.45192 6.45192 6.45192 6.45192 6.45192 6.45192 6.45192 6.45192	6.96138 2.75479 1.19821 4.46468 2.19316 4.65899 2.38662 1.17163 28.5757 2.93594 4.92125 5.68912 1.79038 0.689705	0.0465 0.0455 0.0556 0.0556 0.0556 0.0556 0.0556 0.0556 0.0556 0.0557 0.0557 0.0577 0.0577 0.0077 0.0077	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	#W/A #B/(A #	## ## ## ## ## ## ## ## ## ## ## ## ##							
COMMOGISTERIA 2 - 07 1258005 1258005 1	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.82813 1.6063 0.186553 4.53549 17.9442 0.856853 0.7055873 2.99227 1.90234 2.6818	11.713 2.31714 3.74719 2.08552 2.424401 2.43412 0.975803 1.98382 0.566492 2.52768 18.2817 1.39941 1.09007 3.66644 2.78339 1.06723 1.27532 1.27532	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.866834 2.59776 1.11983 2.02549 12.9453 1.96338 1.96338 1.9638 1.	6 33105 8 34209 1 313406 1 315406 1 4 76601 4 4 20899 1 5 5 746 1 5 5 776 1 5 7775 1 3 7715 1 2 7765 1 3 7765 1 3 7866 1 5 5 5 766 1 5 7765 1 5 7766 1 5 776	6.7983 4.51322 2.25048 3.82731 4.30688 2.91445 1.55446 2.4003 28.2222 2.63906 6.43506 2.4555 6.43506 2.2557 6.2557	6.96138 2.75479 1.29621 4.46408 2.19316 4.05899 3.4012 2.13962 1.17163 28.5757 2.93594 1.93463 4.92125 5.689326 4.92125 1.89096 4.14879	0.0465 0.0469 0.0556 0.0556 0.0557 0.0557 0.0557 0.0557 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577 0.0577	BN/A BN/A BN/A BN/A BN/A BN/A BN/A BN/A	83/A 83/A 83/A 83/A 83/A 83/A 83/A 83/A	##\(\frac{1}{2}\) ##\(\frac{1}\) ##\(\frac{1}2\) ##\(\frac{1}2\) ##\(\frac{1}2\) ##\							
COMMOGISTERIA 2. APT 2359883 31598673.  APT 2559883 3159883 31598673.  APT 2559883 3159883 31598873.  APT 2559883 3159883 31598873.  APT 2559883 31598	21.5473 0 0 2.26333 2.17858 0.406497 2.01835 2.828313 1.6063 0.286533 0.286533 0.705873 0.705873 2.99227 1.98083 1.09234 2.0618	11.713 2.31714 3.24719 2.08552 2.42400 2.43412 0.978803 1.98382 0.56640 2.52768 18.3817 1.09007 3.66644 2.78319 1.07853 1.0785	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.886934 2.5979 1.11983 2.02549 1.96938 1.9693	6 93105 8 31209 3 3 3400 1 3 3400 1 3 3400 1 4 7600 6 6 6 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	6.77983 4.51322 2.25048 3.83781 3.9023 4.30688 2.91445 2.34026 2.44013 28.2222 2.63906 2.28923 6.43506 6.43506 6.43506 1.00851 1.00851	6.95138 2.75479 1.29821 4.46408 2.1391.6 4.56599 3.4012 2.1896.7 1.17163 28.5750 1.17163 4.9212 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063	0.0146/6 0.0149/1 0.0151/2 0.0	BN/A BN/A	##\(\sqrt{\Lambda}\) ##\(\sqrt								
COMMODIFICATION OF THE ACTION	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.92213 1.6063 0.286553 0.75853 0.75853 0.75853 0.75873 2.99227 1.90234 2.02188 2.13906 4.14991 0.21685	11.713 2.31734 3.74719 3.74719 2.43412 2.43412 2.43412 2.43412 2.52768 1.98382 0.566402 2.52768 18.2817 1.39941 1.09007 3.66644 2.78359 1.07573 1.27532 1.27532 1.27532 1.27532 1.27532 1.27532 1.27532	8.72073 1.17002 4.32087 1.68693 1.46511 2.42113 2.850334 2.59776 1.11983 2.02549 12.9453 1.96938 1.95375 1.49063 3.57262 1.08647 1.37189 0.767531 2.24538	6 93105 8 15209 1 3 14406 1 4 1099 6 6 2831 1 15310 1 17715 1 27765 3 30012 1 15310 1	6.7983 4.51322 2.25048 3.83781 3.50235 4.30688 2.94445 2.44013 28.2222 2.63906 6.24502 6.24502 6.24502 6.25	6.95188 2.75479 1.39821 4.46408 2.10316 3.4032 9.308519 1.37821 1.17163 28.5757 2.93594 4.92125 5.66012 0.569790 0.262277 1.44877 0.26227	0.04465 0.01495 0.01495 0.01495 0.01495 0.01496 0.01496 0.01496 0.01496 0.01497 0.0149	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	##\(\sigma_1\) ##\(\s								
COMMOGISTERIA 2. APT 2359883 31598673.  APT 2559883 3159883 31598673.  APT 2559883 3159883 31598873.  APT 2559883 3159883 31598873.  APT 2559883 31598	21.5473 0 0 2.26333 2.17858 0.406497 2.01835 2.828313 1.6063 0.286533 0.286533 0.705873 0.705873 2.99227 1.98083 1.09234 2.0618	11.713 2.31714 3.24719 2.08552 2.42400 2.43412 0.978803 1.98382 0.56640 2.52768 18.3817 1.09007 3.66644 2.78319 1.07853 1.0785	8.72073 1.17002 4.32087 1.68693 1.46111 2.42113 0.886934 2.5979 1.11983 2.02549 1.96938 1.9693	6 93105 8 32009 3 314006 4 76001 4 76001 6 6 5233 5 5346 1 53746 1 53776 1 5777 1 5777 1 5777 3 5001 3 50014 6 6 1832 2 2225 6 1832 2 2275 1 5307 1 5	6.77983 4.51322 2.25048 3.83781 3.9023 4.30688 2.91445 2.34026 2.44013 28.2222 2.63906 2.28923 6.43506 6.43506 6.43506 1.00851 1.00851	6.95138 2.75479 1.29821 4.46408 2.1391.6 4.56599 3.4012 2.1896.7 1.17163 28.5750 1.17163 4.9212 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063 1.17063	0.0146/6 0.0149/1 0.0151/2 0.0	BN/A BN/A	##\(\sqrt{\Lambda}\) ##\(\sqrt								
COMMODIFICATION OF THE ACTION	21.5473 0 2.26333 2.17858 0.406497 2.01835 2.92213 1.6063 0.286553 0.75853 0.75853 0.75853 0.75873 2.99227 1.90234 2.02188 2.13906 4.14991 0.21685	11.713 2.31734 3.74719 3.74719 2.43412 2.43412 2.43412 2.43412 2.52768 1.98382 0.566402 2.52768 18.2817 1.39941 1.09007 3.66644 2.78359 1.07573 1.27532 1.27532 1.27532 1.27532 1.27532 1.27532 1.27532	8.72073 1.17002 4.32087 1.68693 1.46511 2.42113 2.850334 2.59776 1.11983 2.02549 12.9453 1.96938 1.95375 1.49063 3.57262 1.08647 1.37189 0.767531 2.24538	6 93105 8 15209 1 3 14406 1 4 1099 6 6 2831 1 15310 1 17715 1 27765 3 30012 1 15310 1	6.7983 4.51322 2.25048 3.83781 3.50235 4.30688 2.94445 2.44013 28.2222 2.63906 6.24502 6.24502 6.24502 6.25	6.95188 2.75479 1.39821 4.46408 2.10316 3.4032 9.308519 1.37821 1.17163 28.5757 2.93594 4.92125 5.66012 0.569790 0.262277 1.44877 0.26227	0.04465 0.01495 0.01495 0.01495 0.01495 0.01496 0.01496 0.01496 0.01496 0.01497 0.0149	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	##\(\sigma_1\) ##\(\s								
COMMOGRISHES OF 2 128868 1 108867  OF 128868 1 10886  OF 2 128868 1 10886  OF 2 128868 1 10886  OF 2 128868 1 10886  OF 3 12886 1 10886  OF 3 12886  OF 3 1288	21.5473 0 0 2.26333 2.17858 0.4056497 2.01835 2.82831 1.6063 1.806553 4.53649 17.9442 0.856853 0.705873 2.99227 1.99024 2.0818 2.13906 4.14091 0.21688 2.13906 4.14091 0.21688 2.13906 0.21688 2.13906 0.21688 2.13906 0.216888 0.21688 0.21688 0.21688 0.216888 0.21688 0.21688 0.216	11.713 2.31734 3.74719 2.08552 2.43412 2.43412 2.43412 2.43412 2.43412 2.57683 1.98382 2.52768 18.2817 1.39941 1.09007 3.66644 2.78399 1.06723 1.07823 4.4624 4.4624 1.87227 2.08178 0.805621	8.72073 1.17002 1.37067 1.68693 1.46111 2.42113 0.486034 1.259776 1.11963 2.025-90 1.2,9453 1.96913 1.	6 93105 8 15209 1 3 1400 1 3 1400 1 4 1009 6 6 2831 5 1340 1 15317 1 17715 2 7 7951 2 7 7951 3 2007 1 15317 2 7 7951 3 2 7 7951 3 2 7 7951 3 2 7 7951 3 2 7 7951 3 2 7 7951 3 2 7 7951 3 2 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	6.77983 4.51322 2.25048 3.83787 3.50235 4.30688 2.94445 2.34006 2.44013 28.2222 2.63906 2.28923 6.28192 6.23576 2.2557	6.65138 2.73-70 1.19621 4.660 4.650 6.050 1.1716 2.1935 2.1586 1.1716 2.9359 4.421.5 5.660 2.1586 4.21.5 5.660 1.1716 1.1	0.0446	#N/A #N/A #N/A #N/A #N/A #N/A #N/A #N/A	##\(\(\text{\\cince{\ext{\(\text{\(\text{\(\text{\(\text{\(\text{\(\text{\(\text{\\cince{\exiting{\exitin\exit								
COMMODISTRICATION OF THE STATE	21.5473 0 0 2.26333 2.17858 0.406407 2.01835 2.872613 1.56661 0.286553 4.53649 0.556853 1.09234 2.99227 1.90234 2.6183 2.13906 4.44991 0.21685 2.55876 0.721422 5.89182	11.713 2.31714 3.74719 2.08552 2.43401 2.43412 0.976803 1.98382 0.3566402 2.52768 1.39941 1.09007 3.66644 2.78339 1.07573 1.175732 1.17573	8:72073 1.17002 4.32067 1.68693 1.48111 2.42113 2.69776 1.11983 2.03549 1.0353 1.96938 1.0353 1.4903 1.96938 1.0353 1.4903 1.37189 1.0813 1.	6 93105 8 85509 1 3 14805 1 4 2809 1 4 2809 6 6 2233 1 5 3 244 1 5 3 244 1 5 3 244 1 5 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	6.77983 4.51322 2.25048 3.83781 3.50235 3.50235 3.50235 3.50235 3.50235 2.24026 2.44023 2.42022 2.45096 2.2557	6.693.83 2.73-79 1.1901.1 4.646.0 3.403.0 9.905.3 1.1716.0 2.358.0 1.1776.0 2.358.0 1.1776.0 2.358.0 1.1776.0 1.000.0	0.0446	# # # # # # # # # # # # # # # # # # #	##\(\sigma_1\) ##\(\s								
COMMOGENETAL 2. APT 2359883 1599827.  APT 2559883 1599827.  APT 255983 159982.  APT 255983 159982.	21,5473 0 2,26331 2,17836 0,405497 2,01835 0,405497 2,01835 1,5063 1,5063 1,50649 1,75442 0,856853 1,078347 2,9227 1,9063 1,07254 2,586853 1,07254 2,586853 1,07254 2,586853 1,07254 2,58685 2,58685	11.713 2.31714 3.74719 2.08552 2.43401 2.43412 0.978803 1.98382 0.566402 2.527788 13.2817 1.39941 1.09007 3.666644 2.78339 1.06723 1.27532 1.2	8.72073 1.17002 4.33087 1.68093 1.46111 2.42113 2.6213 2.02549 1.11983 2.02549 1.11983 1.19938 1.19938 1.19938 1.19938 1.19938 1.19938 1.19938 1.19938 1.19938 1.19938 1.19335 1.19938 1.19335 1.19	6 33105 8 34509 8 34509 4 37601 4 37601 4 37601 1 6 2311 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2711 1 5 277 1 5 2	6.77983 4.51322 2.25048 3.83781 3.50235 4.50688 2.91445 2.34006 2.34006 2.44013 2.8.2222 2.63006 2.28933 6.28132 6.24550 2.28530 2.28933 4.46569 4.4259	6.693.89 2.75-70 1.1961.21	Gardes Gates	# # # # # # # # # # # # # # # # # # #	##\(\sqrt{h}\)								
COMMOGRISHES ANY JUSTICAL STREET, LINEAR STREET	21,5473 0 2,26333 2,17858 0,406497 2,01835 2,28341 1,5065 0,286553 0,286553 0,286553 1,5065 0,786553 1,5065 1,75442 0,556653 1,00234 2,99227 1,99227	11.733 2-31714 3.74719 2.08552 2.42401 2.48412 0.978401 1.9882 0.556402 2.52766 18.2817 1.9941 1.9902 1.00723 1.00723 1.00723 1.00723 1.7753 1	8.72073 1.17002 4.31087 1.58693 1.46511 2.42113 0.866384 2.159776 1.11982 1.25976 1.11982 1.25976 1.40663 1.95938 1	6 93105 8 13205 8 13205 1 1320	6.77983 4.51322 2.25048 3.83731 3.50235 4.30588 2.291445 2.30025 2.40031 2.8.2222 2.63006 2.26032 6.43506 2.26031 1.19232 1.19523 4.65590 1.26903	6.953.93 2.75-70 1.392.11 4.053.93 4.053.93 1.407.11 1.1776 2.657.93 1.109.	0.01465 0.0157	### ### #### #### ####################	##\(\text{A}\).								
COMMODISTRICATION OF THE STATE	21,5473 0 2,65313 2,7858 0,466497 2,8213 2,8213 2,8213 1,79442 1,79	11.714 3.74719 2.74719 2.74810 0.97830 0.97830 0.97830 0.97830 13.7471 1.0900 1.7782 1	8,72073 1,17002 4,33087 1,46111 2,4113 1,46111 2,59776 1,11983 2,02540 1,11983 1,11	6 59100 8 15000 1 1	6.77983 4.51322 2.25048 3.83213 3.50235 4.06388 2.291445 3.50235 4.06388 2.291445 2.44013 2.24023 2.2523 6.28192 6.28192 6.43506 2.25576 2.09093 1.08051 1.08051 1.18503 2.09093	6.693.83 2.73-72 1.392.1 4.646.0 4.0599 3.407.2 5.905.1 1.1716.0 1	0.0446		##\(\text{\text{\$\lambda}}\) ##\(\text{								
COMMODISTRICATION OF THE STATE	21,5473 0 2,26333 0,406407 2,10858 0,406407 2,01835 2,22313 1,10603 1,206553 1,206553 1,5063	11.713 2.31714 3.24719 2.08552 2.48401 2.78401	8.72073 1.17002 4.31087 1.58693 1.46511 2.42113 0.866384 2.02549 1.11982 1.25497 1.11982 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.15497 1.	6 51100  4 30000  4 30000  4 30000  4 30000  4 30000  1 5 3000  1	6.778838.4 4512122 2:55464.5 3.50213 3:50235 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3	6.693.83 2.75-70 2.75-	0.0466 0.0456 0.	### ### #### #### ####################									
COMMODISTRICATION OF THE STATE	21,5473 0 2,26333 0,406407 2,10858 0,406407 2,01835 2,22313 1,10603 1,206553 1,206553 1,5063	11.713 2.31714 3.24719 2.08552 2.48401 2.78401	8.72073 1.17002 4.31087 1.58693 1.46511 2.42113 0.866384 2.02549 1.11982 1.25497 1.11982 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.05497 1.15497 1.	6 51100  4 30000  4 30000  4 30000  4 30000  4 30000  1 5 3000  1	6.778838.4 4512122 2:55464.5 3.50213 3:50235 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3:5025 3	6.693.83 2.75-70 2.75-	0.0466 0.0456 0.	8 85/A 85/A 85/A 85/A 85/A 85/A 85/A 85/									
COMMOGRISHES ANY JURISHIES SERVICES ANY JURISHIP SERVI	21.5473 0.26333 2.17858 0.466497 2.40835 2.82831 1.40665 1.80653 0.286553 0.286553 0.758653 0.75867 1.90063 1.9007 1.90063 1.9007 1.90063 1.9007 1.90063 1.9007 1.90063 1.9007 1	11.713 2.31714 3.24719 2.08552 2.4861 2.5766 0.97803 1.09	8.72073 1.17002 4.31087 1.68693 1.46511 2.42113 0.660834 1.25776 1.11983 1.20540 1.20540 1.20540 1.37180 1.	6 6 5150  1 1,000  4 1,000  4 1,000  4 1,000  1	6.778828.4 451222.2.25046 3.83272.3.3.3023 2.9445 2.4401 2	6.6515.00 2.75-7	0.0466 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0257 0.	88\(\)\(\)\(\)\(\)\(\) 8\(\)\(\)\(\)\(\)\(\)\(\)\(\) 8\(\)\(\)\(\)\(\)\(\)\(\)\(\)\(\)\(\)\(\	##\(\text{\te}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texict{\text{\texit{\text{\texict{\texitt{\texict{\texict{\texit{\texict{\texictex{\texicr{\texictex{\texiclex{\texitt{\texi{\texi{\texict{\texictex{\texicr{\terimtex{\tex								
COMMODISTRICATION OF THE STATE	21,5473 0 2,26333 0,406407 2,17858 0,406407 2,01835 2,27813 1,10663	11.713 2.31714 3.24719 2.08552 2.48401 2.78401 9.78602 9.78602 1.58582	8.72073 1.17002 4.31087 1.68093 1.46511 2.42113 0.860834 2.52776 1.11983 1.0513 1.0513 1.0513 1.0513 1.05751 1.0575	6 63100 4 7000 4 7000 4 7000 5 700 1 70	6.7788826.22 2.25048.33 3.2023.33 3.	6.65(3) 2.75-70 2.75-70 2.75-70 3.75-7	0.0466 0.0256 0.	8 8 1/A 8 8 1/A 8 8 1/A 8 1	##\(\text{A}\) ##\(\t	##(A)							
COMMODISTRICAL DE L'ANTIGNATION DE L'ANT	21,9473 0,22,6333 0,406497 2,0333 2,17838 0,406497 2,0333 2,23313 1,40653 1	11.713 2.31714 3.24719 2.26552 2.48652 2.48461 0.97800 0.55690 1.50720	8.72073 1.17002 4.31087 1.68693 1.46511 2.42113 0.660834 2.52776 1.11983 1.20544 1.20543 1.	6 5100  4 1,000  4 1,	6.778828.4.4.51222.2.2.5048.4.51222.2.2.5048.4.51222.2.2.5048.4.51222.2.2.5048.4.51222.2.2.5048.4.51058.4.5125.4.5125.2.5	6.9519 2.75-07 2.75-07 4.45-09 4.45-09 4.95-07	0.04666 0.04556 0.04556 0.04556 0.04556 0.04556 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.045666 0.045666 0.045666 0.045666 0.0456666 0.04566666666666666666666666666666666666	881/A 81/A 8	##\(\text{A}\) ##\(\t	## (A) ##							
COMMOGRISHES 97 129869 129861 109867 97 129869 129861 109867 97 129869 129861 109867 97 129869 129861 10986 97 129869 129861 10986 97 129869 129861 10986 97 129869 129861 10986 97 129869 12986 .	21,473 0,26131 0,266497 2,1988 0,666497 2,1988 1,1668 1,16	11.713 2.231724 3.24719 2.24812 2.24812 1.2481	8,2073 1,17002 4,31087 1,68093 1,46511 2,42113 0,860834 1,25276 1,11983 1,0513	6 52100 1 3 1400 1 4 3 500 1 4 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 500	6.7788826.22 2.25048.33 4.30232 4.30233 4.30233 4.30233 4.30233 5.24202 2.44013 6.3122 6.312	6.8010 2 75-07 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.0460	BRIVA	##\(\triangle \) ##\(\t	## (A)   ##							
COMMOGRISHES 97 129869 129861 109867 97 129869 129861 109867 97 129869 129861 109867 97 129869 129861 129861 97 129869 12986 97 129869 12	21,473 0,26131 0,266497 2,1988 0,666497 2,1988 1,1668 1,16	11.713 2.231724 3.24719 2.24812 2.24812 1.2481	8,2073 1,17002 4,31087 1,68093 1,46511 2,42113 0,860834 1,25276 1,11983 1,0513	6 52100 1 3 1400 1 4 3 500 1 4 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 3 500 1 5 500	6.7788826.22 2.25048.33 4.30232 4.30233 4.30233 4.30233 4.30233 5.24202 2.44013 6.3122 6.312	6.9519 2.75-07 2.75-07 4.45-09 4.45-09 4.95-07	0.0460	881/A 81/A 8	##\(\triangle \) ##\(\t	## (A)   ##							
COMMODISTRICATION OF THE STATE	21.5473 0 2.26313 2.17853 2.17853 2.17853 2.17853 2.28213 1.0661 0.286553 4.51649 1.75442 0.286653 1.96663	11.713 2.31714 3.24719 2.28524 2.28652 2.28652 2.28652 1.28652	8,72073 1,17002 4,32087 1,68093 1,46111 2,47113 0,860834 2,59776 1,17863 1,24713 1,	6 6 5100 4 7 500 4 7 500 4 7 500 5 7 500 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6.7788826.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.	6.9512 273-72 27	0.0446	## ## ## ## ## ## ## ## ## ## ## ## ##	##\(\text{\te}\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texict{\texit{\text{\texict{\texit{\texict{\texict{\texit{\texit{\texict{\texictex{\texicr{\texictex{\texiclex{\texitt{\texict{\terintet{\texict{\texictex{\texicr{\terinte	##(A)							
COMMODISTRICATION OF THE STATE	21,473 0,26131 0,266497 2,1988 0,666497 2,1988 1,1668 1,16	11.713 2.231714 3.24719 2.48121 2.48121 2.48121 2.97861 1.9882	8,72073 1,17002 4,32087 1,58903 1,48511 2,42113 2,42113 1,59776 1,5	6 6 5100  1	6.77888 4.5122 2.75048 4.5122 2.75048 4.5122 2.75048 4.5122 2.75048 4.5058 4.50	6,931.90 2,75-0,70 2,75-0,70 4,445-90 4	0.04666 0.04556 0.04556 0.04556 0.04556 0.04556 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.04566 0.045666 0.045666 0.045666 0.045666 0.0456666 0.04566666666666666666666666666666666666	BN/A	##(A)	## (A) ##							
COMMOGISTERS 2. APT 2359083 2159087 A TOTAL COMMOGISTERS 2. APT 235908 215908 A TOTAL COMMOGISTERS 2. APT 235908 A TOTAL COMMOGIS	21,1473 0 2,26131 0,26631 2,17858 0,66669 2,17858 1,17858 1,16661 1	11.713 2.31724 3.24729 2.08553 2.08553 2.08553 1.08582 2.52768 3.58642 2.52768 3.56642 1.0862 1.08622	8,72073 1,17002 4,31067 1,68063 1,68063 1,68063 1,68063 1,68063 1,59776 1,5	6 5200 1 1000 1 1000	6.77888 4.5122 2.75048 3.75048	6.9019 2.75-07 2.75-07 4.45-09 2.75-07 4.45-09	0.0460	### #### #############################	##\(\triangle \) ##\(\t	## (A)							
COMMODISTRICATION OF THE STATE	21.473 0.26513 2.17853 2.17853 2.17853 2.01853 2.01853 2.87813 1.40601 0.706273 0.7062	11.731 2.23174 3.24729 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.7662 1.68523 1.68523 1.68523 1.68523 1.78523	8,72073 1,17002 4,32087 1,68093 1,46111 0,66639 1,46111 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,2	6 6 5100  4 7 500  4 7 500  4 7 500  5	6.77882 4.51222 2.125464 2.125	6 8010 2 175-10 1 1 175-10 1 1 175-10 1 1 175-10 1 1 175-10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.0466	BN/A	##(A)	##(A)							
COMMODISTRICAL POR TRANSPORTER STATEMENT AND ADMINISTRATION OF THE	21.473 0.26313 2.6313 2.6313 2.6313 2.6313 2.6313 1.0661 0.45663 1.78462 1	11.713 2.31714 3.24719 2.31714 2.43719 2.44719 2.44	8,72073 1,17002 4,31067 1,68063 1,481113 1,68063 1,481113 1,68063 1,19978 1	6 6 9300  1 1 1000  2 1 1000  4 1000  4 1000  4 1000  4 1000  5 1000  1 1000	6.77988 4.51212 2.15048 4.51212 2.15048 4.10888 4.10888 4.10888 4.10888 4.10888 2.14444 1.155446 1.155	6 00 10 10 10 10 10 10 10 10 10 10 10 10	0.01466 0.01576 0.01576 0.01576 0.01576 0.01576 0.01576 0.01576 0.01577 0.0157	### #### #############################	##(A)	## (A) ##							
COMMODISTRICATION OF THE STATE	21.473 0.26513 2.17853 2.17853 2.17853 2.01853 2.01853 2.87813 1.40601 0.706273 0.7062	11.731 2.23174 3.24729 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.68523 2.7662 1.68523 1.68523 1.68523 1.68523 1.78523	8,72073 1,17002 4,32087 1,68093 1,46111 0,66639 1,46111 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,15809 1,24113 1,2	6 6 5100  4 7 500  4 7 500  4 7 500  5	6.77882 4.51222 2.125464 2.125	6 8010 2 175-10 1 1 175-10 1 1 175-10 1 1 175-10 1 1 175-10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.0466	BN/A	##(A)	##(A)							
COMMOGISTERS 2. APT 2359863 2159867 A COMMOGISTERS 2. APT 2359863 215987 A COMMOGISTERS 2. APT 235986 215988 A COMMOGISTERS 2. APT 235986 A	21.473 0.26313 2.6313 2.6313 2.6313 2.6313 2.6313 1.0661 0.45663 1.78462 1	11.713 2.31714 3.24719 2.31714 2.43719 2.44719 2.44	8,72073 1,17002 4,33087 1,58063 1,58063 2,47113 2,47113 2,03540 1,58063 1,5	6 5200 1 1000 1 1000	6.77988 4.51212 2.15048 4.51212 2.15048 4.10888 4.10888 4.10888 4.10888 4.10888 2.14444 1.155446 1.155	6 00 10 10 10 10 10 10 10 10 10 10 10 10	0.01466 0.01576 0.01576 0.01576 0.01576 0.01576 0.01576 0.01576 0.01577 0.0157	BY(A	##\(\text{PL}\)  ##\(\t	## (A) ##							
COMMODISTRICATION OF THE STATE	21.4713 0.2 26313 0.2 26313 2.0 245420 2.0 24313 1.0 6013 1.0 6013 1.	11.733 2.31724 3.24279 2.4401 2.4401 2.4401 3.05640 2.55766 11.201 3.55640 11.201 3.55640 11.201 3.55640 11.201 3.55640 11.201 3.55640 11.201 3.55640 11.201 3.56640 11.201	8.72073 1.17002 4.32087 1.30807 1.660631 2.43113 2.43113 2.05540 1.050540 1.0	6 6 5100  4 7 500  4 7 500  4 7 500  5 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	6.77982 4.51222 2.25046 3.25046 4.30688 3.30732 3.30732 3.30732 3.3072 3	\$6939. 2,000. 2,	0.0466 0.0457 0.	BY(A	##\(\text{\texict{\text{\texit{\text{\texit{\text{\texict{\texict{\texit{\texit{\texictex{\texict{\texit{\texi{\tex{\texictex{\texitt{\texi{\texict{\texictex{\texict{\terintet{\tex	##(A)							
COMMODISTRICATION OF THE STREET STREETS AND ADMINISTRATION OF THE STREETS	21.473 0.00 2.333 2.333 2.333 2.333 2.333 1.00	11.713 2.231714 3.24719 2.24711 2.44712 2.44712 2.44712 2.44712 2.44712 2.44712 2.44712 2.44712 2.44712 2.44712 1.59641 1.59641 1.09672 1.27532 1.2	8,72073 1,17002 4,37067 4,37067 1,37067 1,46111 2,42111 2,42111 2,42111 2,42111 1,56111 1,5	6 6 5100  4 1 1000  4 1 1000  4 1 1000  4 1000	6.77982 4.5122	\$600   1,000	0.0466 0.0455 0.	BY(A	##(A)	## (A) ##							
COMMOGISTERS 2. APT 2359063 2159057 COMMOGISTERS 2. APT 2359067 2159057 2159057 2159057 COMMOGISTERS 2. APT 2359067 2159057 2159057 2159057 COMMOGISTERS 2. APT 2359067 2159057 21	21.1473 2.3332 2.333	11.713 3.24279 2.31724 3.24279 2.43401 2.43412 2.43412 2.43412 2.43412 1.9342	8,72073 1,17002 43,7067 1,26063 1,26063 2,247113 2,247113 2,05540 1,19673 1	6 5200  1 1000	6.77982 4.5132	1,000 1,000	0.0466 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0257 0.	## 10 / A ## 10	##\(\text{P}\) = ##\(\t	## (A)   ##							
COMMODISTRICATION OF THE STATE AND ADDRESS ASSESSMENT OF THE STATE	21.1473 2.2323 2	11.713 2.31714 3.24023 2.4401 2.4401 2.4401 3.09520 3.05640 2.4401 3.05640	8,72073 1,17002 4,30677 1,30677 1,45011 2,47111 2,47111 2,47111 2,47111 1,56011 1,5	6 6 5100  4 7 500  4 7 500  4 7 500  4 7 500  5 7 500	6.77982 4.15122 2.120444 4.15122 2.120444 4.15122 2.120444 4.10488 4.1	\$500   \$5	0.0466 0.0457 0.	## 10 PA	##(A)								
COMMOGISTERS 2. APT 2359063 2159057 COMMOGISTERS 2. APT 2359067 2159057 2159057 2159057 COMMOGISTERS 2. APT 2359067 2159057 2159057 2159057 COMMOGISTERS 2. APT 2359067 2159057 21	21.1473 2.3332 2.333	11.713 3.24279 2.31724 3.24279 2.43401 2.43412 2.43412 2.43412 2.43412 1.9342	8,72073 1,17002 43,7067 1,26063 1,26063 2,247113 2,247113 2,05540 1,19673 1	6 5200  1 1000	6.77982 4.5132	1,000 1,000	0.0466 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0256 0.0257 0.	## 10 / A ## 10	##\(\text{P}\) = ##\(\t	## (A)   ##							

Supplemental Table 3. Overlay between PXR-DNA binding and epigenetic marks around IncRNA gene loci on chromosomes 5, 12, and 15

	# IncRNAs not	# IncRNAs stably	# IncRNAs increased	# IncRNAs decreased
Epigenetic marks	expressed	expressed	by PCN	by PCN
H3K4me2	1680	174	9	13
H3K27me3	303	1	0	0
5MeC	1234	67	2	0
PXR	8257	753	45	70
PXR & H3K4me2	500	62	6	9
PXR & H3K27me3	11	0	0	0
PXR & 5MeC	121	9	0	0